

SMITHSONIAN Zoogoeer

Published by **FRIENDS OF THE NATIONAL ZOO**

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How Do Primates Think?

- » POLAR BEAR Lessons
- » Zoo Animal ENRICHMENT
- » FONZ Summer Camps



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JESSIE COHEN/NZP

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SMITHSONIAN Zoogoer



is the dedicated partner of the Smithsonian's National Zoological Park. FONZ provides exciting and enriching experiences to connect people with wildlife. Together with the Zoo, FONZ is building a society committed to restoring an endangered natural world. Formed in 1958, FONZ was one of the first conservation organizations in the nation's capital.

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On the cover: Studying apes, like the Zoo's orangutan Bonnie, helps us learn about how our minds work. Photo by Jessie Cohen/NZP.



The Smithsonian's National Zoo is accredited by the Association of Zoos and Aquariums.



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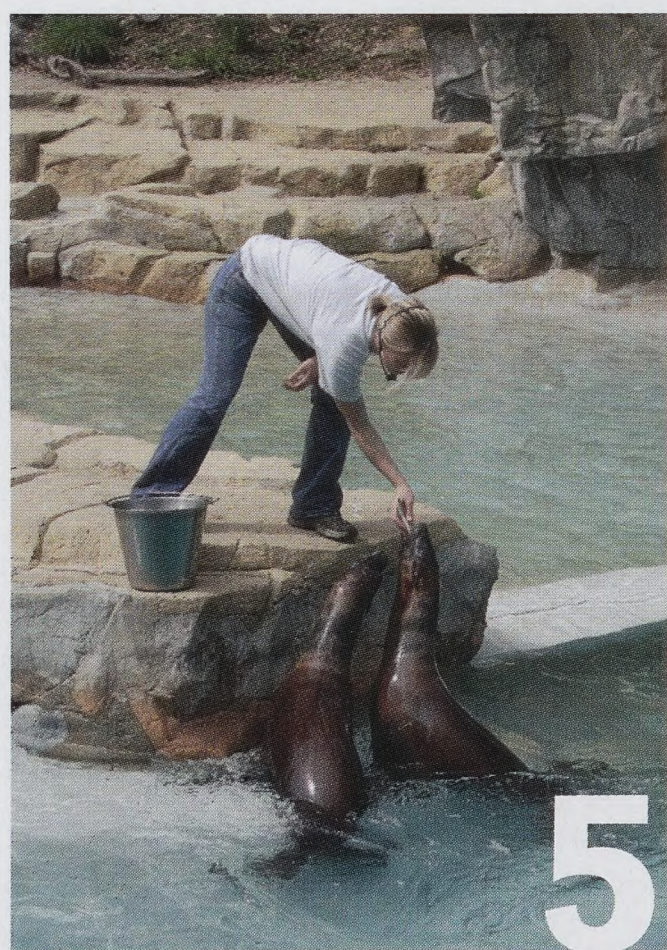
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A PROMISING NEW YEAR

WELCOME TO A NEW YEAR, FROM ALL OF US AT THE SMITHSONIAN'S NATIONAL ZOO! As you can see, we're ringing in 2009 with a fresh look for our flagship publication. The magazine's new name, **Smithsonian Zoogoer**, reflects our combined role as a vital part of the Smithsonian Institution, and as a public treasure for visitors from around the world. I invite you to read through these pages and explore all that is happening here at the National Zoo, from cutting-edge research to animal births to kids' camps. We're proud that our Zoo has this multifaceted personality. Our scientists perform serious work every day, while our visitors enjoy the fun side of seeing our animals and experiencing our events and guest services.

Our New Year's resolution is an optimistic one: to continue our steady march to become the world's finest zoo by 2016. In these difficult economic times, we are all searching for ways to move forward. I believe we are well-equipped to move together in the right direction. We have phenomenal staff—both at our downtown location and at our Conservation and Research Center in Front Royal, Virginia—working together to support our mission of providing leadership in animal care, science, education, and sustainability. As is the case across the country, we are being careful about our spending so that no resources are wasted on anything but strengthening the key pillars of that mission.

For our visitors, we have a simple resolution: to continue providing you the best possible visitor experience. This year we'll make significant improvements to our exhibits and facilities. That means better and safer environments for our animals and more enriching ways to experience the Zoo for our guests. Elephant Trails will take shape over the year, creating enhanced habitat for our endangered Asian elephants. The National Zoo is a leader in the conservation and breeding of Asian elephants, and this major renovation will enable us to pursue greater protections for this valuable species. Down the hill, look for updates at Amazonia by this spring, including an expanded amphibian exhibit displaying new creatures and information about the Zoo's role in saving amphibian species worldwide. We also have exciting plans for a new seal and sea lion environment, which will create



MEGHAN MURPHY/NZP

a more naturalistic habitat for our pinnipeds and interactive areas for visitors.

Also, as you'll learn in our cover story, our Think Tank exhibit is a busy place this year, with fascinating new research studies underway to explore how great apes think. The World Association of Zoos and Aquariums has dubbed this the Year of the Gorilla, so come be a part of that by observing or even participating in one of our primate studies.

We resolve to keep improving here at the Zoo throughout the year and into the future. As a Smithsonian venue, we can do all this yet still offer free admission to our guests. So come on in—we promise you a lot of bang for your buck! Happy 2009!

Sincerely,

John Berry

Director, Smithsonian's National Zoological Park

SOMETHING FOR EVERYONE



JESSIE COHEN/NZP

WE ARE VERY EXCITED TO BEGIN 2009 BY INTRODUCING OUR NEW SMITHSONIAN ZOOGOER, an expanded publication that combines the very best of *Zoogoer* and *Wildlife Adventures* into one colorful, bimonthly magazine. The new publication offers something for everyone—including fabulous features on the important work done every day at the Smithsonian's National Zoo, as well as beautiful animal photos, conservation tips, and information about upcoming events. Our new format will significantly reduce our publication and mailing costs and help us in our commitment to act sustainably in all we do.

As part of our ongoing effort to provide the most up-to-date information to our members and to the general public, we will also be redesigning our website's home page, to enhance the online experience and allow for more direct access to Zoo news and member updates. Be sure to visit our website at <http://nationalzoo.si.edu> daily, as new information will be posted often. The new and improved home page will debut in February.

One of FONZ's key goals is to help the Zoo become the world's best by 2016. Part of this mission includes enhancing the quality of the visitor experience. Last year we listened to our members' suggestions and brought in additional food options, improved the variety and quality of merchandise in the gift shops, and worked with the Zoo to improve our educational offerings and make our Zoo one of the most attractive destinations in Washington, D.C. The revenues generated by FONZ activities advance the animal care, education, science, and sustainability goals of the Zoo.

In the coming months, some FONZ events to look for include Woo at the Zoo, a special Valentine evening that will be held on Thursday, February 12, and summer camp registration, which will kick off on February 3. Our camps sell out quickly so be sure to register early. Over the last two years, our summer camp programs at both our downtown and Front Royal, Virginia, locations received awards from the American Camp Association and Nickelodeon for environmental education and best day camp, respectively.

I want to begin this New Year by expressing my thanks to you, our FONZ members, for your continued support of the Zoo in these difficult economic times. Your membership dollars go a long way to support the Zoo and the huge improvements that we are making now. We encourage you to promote the benefits of a FONZ membership with your family and friends. Remind them that the Zoo is free every day and is a delightful place to visit year round! I hope to see you soon.

Happy New Year!

Sincerely,

Bob Lamb

Executive Director, Friends of the National Zoo

ANIMAL NEWS

JESSIE COHEN/ NZP



OUTSIDE THE BIRD HOUSE, TWO ROSEATE SPOONBILL CHICKS (*Ajaia ajaja*)

hatched in late September. Since spoonbills don't usually start a family that late in the year, keepers had to protect these tropical South American birds from the cold. So they moved the chicks, their parents, and a two-month-old juvenile to the big greenhouse exhibit inside the Bird House.

In the wild, the spoonbills' breeding range extends from Florida through the Greater Antilles to Argentina and Chile. They inhabit marshes, swamps, ponds, and rivers, feeding in both fresh and saltwater wetlands. They breed and travel in flocks.

JESSIE COHEN/ NZP



TUMAI IS BACK! We welcomed our female cheetah (*Acinonyx jubatus*) back to the National Zoo in December from our Conservation and Research Center (CRC) in Front Royal, Virginia. Tumi, whose name means "hope" in Swahili, gave birth to the Zoo's first litter of cheetah cubs in 2004. Our keepers hope this mother of four will help the Zoo's younger cheetahs get a better sense of how to breed. Our three young males haven't made the right moves yet for Amani, our young female, but the hope is that Tumi might demonstrate how a female cheetah can signal interest in a male.

Also, a one-and-a-half-year-old female cheetah named Ally arrived at CRC from Oregon's Wild Safari in November. She is part of the Zoo's program to continue breeding cheetahs that have the best genetic makeup to strengthen the population of this vulnerable species.

MEHGAN MURPHY/ NZP



OUT AT THE ZOO'S CONSERVATION AND RESEARCH CENTER, keepers welcomed three **Eld's deer** (*Cervus eldii*) fawns this fall. The Eld's deer, indigenous to Southeast Asia and named after British officer Lt. Percy Eld in 1844, is an endangered subspecies that is nearing extinction in the wild. Fewer than 2,000 remain.

MEHGAN MURPHY/ NZP



The National Zoo is also proud to announce the birth of a ten-pound female **dama gazelle** (*Gazella dama*) calf born in November to two-year-old female Adara. The rambunctious calf is healthy and thriving in her new environment. She and her mother are bonding and doing well. You should be able to see her on exhibit at the Cheetah Conservation Station.

The calf brings the number of the Zoo's dama gazelles up to four. Another five live at the Zoo's Conservation and Research Center. In the wild, dama gazelles are a critically endangered species. Hunting and poaching have decreased population sizes, and now fewer than 500 of these gazelles remain in the wild.

EXHIBIT NEWS

The Zoo's **Amazonia Exhibit** will undergo renovations from January to April, causing partial closures at times. Look for some new features this spring, including improved greenery and lighting, and Amazonia Science Gallery updates that highlight Zoo scientists' leading role in protecting amphibians from environmental threats.

Exciting new plans are in place for a new **seal and sea lion exhibit** in the Zoo's Beaver Valley area. By 2011, visitors will be able to see our seals and sea lions in a re-designed exhibit that simulates the animals' natural habitat with rocky pools and underwater windows. Improvements will include better support systems for the animals, and interactive materials to teach visitors about conservation where land meets sea.

Elephant Trails is still growing steadily. Come learn about elephant conservation at our new Visitor Center kiosk or offer your support at www.fonz.org/elephanttrails.htm. Golden Lion Tamarin Walk and Bird House Road remain closed.

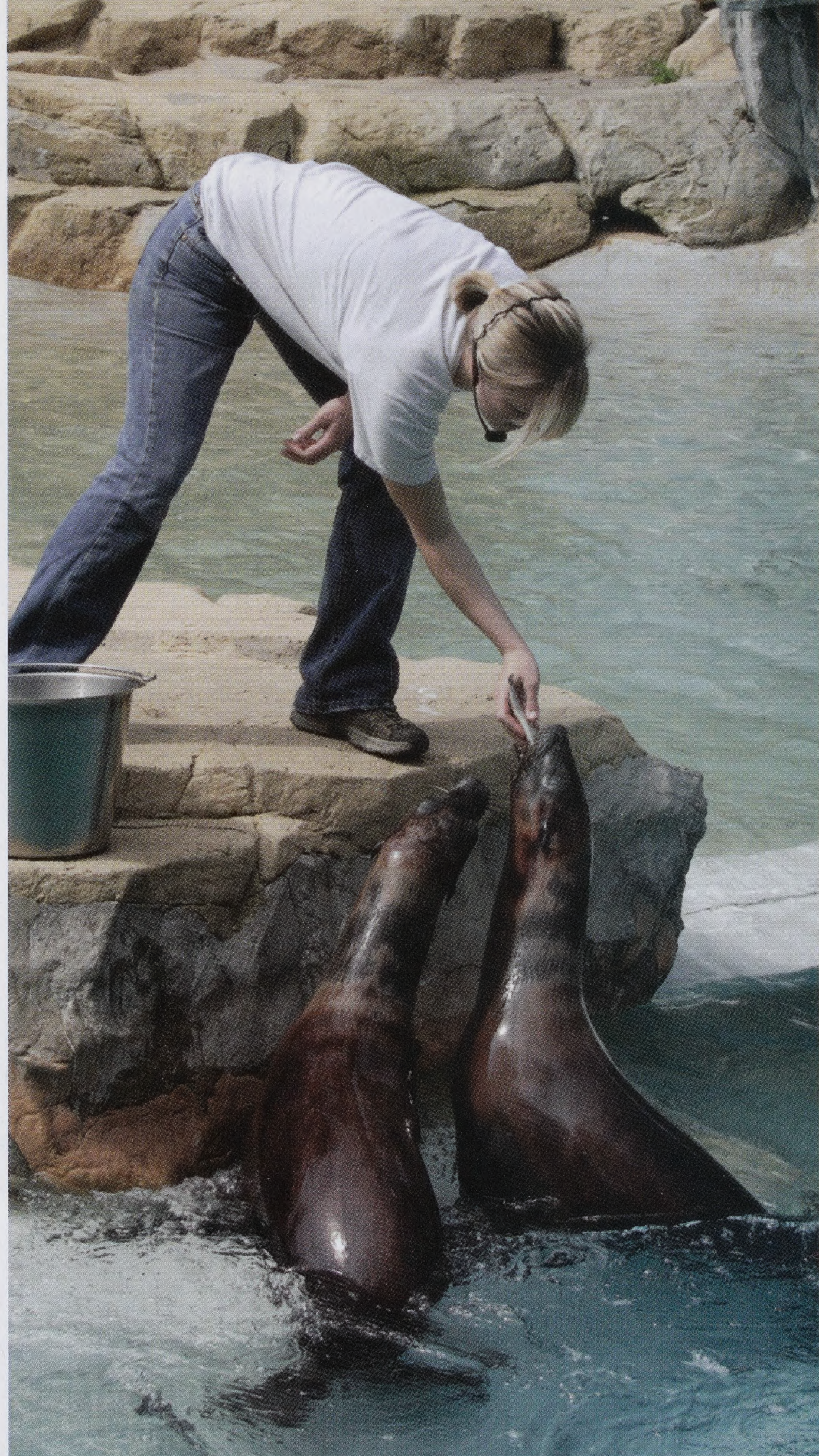
SEE A SHOW AND THE ZOO

Come to Kids' Farm for a free winter education program, offered as part of a partnership between Friends of the National Zoo and **Imagination Stage** in Bethesda, Maryland. Learn more about the National Zoo's new silver fox rabbits along with other Kids' Farm animals and participate in fun and lively morning activities. The program is offered at 10 a.m. on February 28, March 1 and March 7 and 8. It will connect with the themes of **Zomo the Rabbit: A Hip-Hop Creation Myth**, a play being performed at Imagination Stage. For details, visit www.fonz.org/events.htm or www.imaginationstage.org.

EARTHQUAKE RELIEF CONTINUES

Months after a magnitude 8.0 earthquake devastated central China's Sichuan Province—home to 46 giant panda (*Ailuropoda melanoleuca*) reserves and 75 percent of the estimated 1,600 wild pandas—the National Zoo's giant panda conservation programs in that region continue. Efforts are also underway to rebuild a destroyed breeding facility and assess the impact on panda habitat.

Within weeks of the May 12 quake, the National Zoo and FONZ launched a relief campaign that in two months solicited 900 donations totaling \$92,000. In June, the Giant Panda Conservation Foundation and the Association of Zoos and Aquariums (AZA) made an initial donation to the China Wildlife Conservation Association of \$165,000 that was raised by the National Zoo and 14 other AZA-accredited zoos. The AZA recently sent an additional \$82,000 to China as part of ongoing relief efforts.



MEGHAN MURPHY/NZP



MEGHAN MURPHY/NZP



JESSIE COHEN/NZP

FIND VET STORIES ONLINE

Be sure to go to the Zoo's website and check out the latest "Spotlight on Vet Medicine."

You'll learn about a successful eye surgery on Tian Tian, one of the Zoo's giant pandas. When one of Tian Tian's eyes became red and swollen, vets had to

decide how to treat it. The challenge they faced was how to remove the irritated tissue without affecting the gland that produces tears, which are essential to keeping the eye healthy. Go to <http://nationalzoo.si.edu/goto/vetmedicine> to find out what happened. And watch for new veterinary cases to be highlighted on the Zoo's website throughout the year.



JESSIE COHEN/ NZP

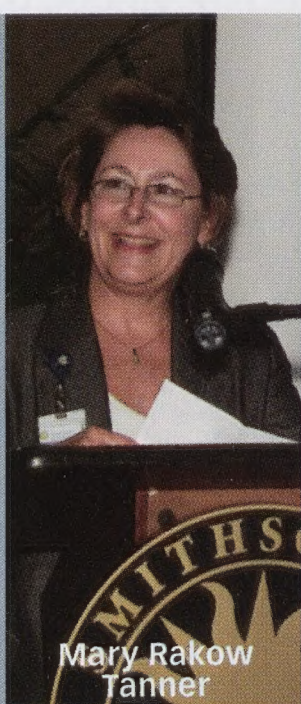


JESSIE COHEN/ NZP

HOORAY FOR HORTICULTURE The National Zoo congratulates our 13 groundskeepers, who won an Honor Award this October from the Professional Grounds Management Society in its 2008 Green Star Award Competition. Our ground crew keeps the Zoo's 163 acres looking fabulous, from the waving bamboo on Asia Trail to the jungle vines of Amazonia. Their excellent maintenance sets our Zoo apart from the government facilities, universities, amusement parks, and other zoos in this national competition.

The Smithsonian National Zoo's deputy director, **Mary Rakow Tanner**, retires from her position this month. Since 2002, Tanner has served three directors and overseen the Zoo's senior managers in research, animal programs and health, maintenance, exhibits and park management, education, communications, administration and technology. She coordinated Zoo business from the ground up, working with keepers, police officers, and staff at all levels. She also kept the Zoo and Friends of the National Zoo advisory boards informed of the Zoo's budgetary situation. She helped facilitate key programs at the Zoo's Conservation and Research Center, including its partnership with George Mason University.

Tanner helped foster the Zoo's connection to the rest of the



Mary Rakow Tanner



Alison McNally



Joseph M. Sacco

STAFF NEWS

Smithsonian Institution (SI), which she has served for 36 years. She was senior executive officer to the Under Secretary for Science and the Provost, Associate Director for Administration at the National Museum of Natural History, and served in other administrative posts at the Air and Space Museum and the central facilities office, and on

several SI committees. Some of her memories of working with the Smithsonian at the SI include attending several inaugural balls, the 150th anniversary, and meeting her husband Robert. We will miss her and her leadership here at the National Zoo.

Alison McNally will take the reins as deputy director of the Zoo when Mary Tanner retires in January. Most recently, McNally represented the SI to the FONZ Advisory Board, and was Acting Undersecretary for Finance and Administration for SI, overseeing several Smithsonian departments. McNally served the SI as principal advisor to the Under Secretary for Science, and she previously spent more than 25 years with NASA, including time as deputy associate administrator for the Science Mission Directorate at its headquarters. She will join us in

helping the National Zoo reach its goal of becoming the world's finest zoo by 2016.

The National Zoo welcomes new Associate Director for Education **Joseph M. Sacco**. Starting in January, Sacco will head all education programs based at the Zoo and its Conservation and Research Center in Front Royal, Virginia, for K-12 students, FONZ members, and community partners. During his 32 years of education work, Sacco started a "Community Ecology and Technology Academy" at John Poole Middle School in 1997, earning the school recognition as a Maryland "Green School." He planned and opened Lakelands Park Middle School in Montgomery County in 2005, serving as its principal since then. He also served as the president of the Montgomery County Public Schools' administrative organization.


Mark Your Calendar

- January 27 Priority registration for FONZ summer camps begins at www.fonz.org/camps.htm. If you are a Contributing Member (\$100) or higher, you can register your children early for FONZ Nature Camp or Summer Safari Day Camp.
- February 3 General registration for FONZ summer camp begins at www.fonz.org.
- February 12 Come to Woo at the Zoo for your Valentine's celebration. Check www.fonz.org/events.htm for details.
- March 14 Cockadoodle Zoo is coming earlier this year—don't miss this popular family event!

LOOK FOR THE FONZ MEMBER SECTION STARTING ON PAGE 29 FOR INFORMATION ABOUT EVENTS, CLASSES, CAMPS, AND MORE! Be sure to turn to the FONZ section in each issue of *Smithsonian Zoogoer* to stay up to date on the latest exciting happenings at the Smithsonian's National Zoo.

Join the Zoo Crew

Friends of the National Zoo is looking for enthusiastic team players to join our seasonal staff in food services, guest services, and merchandise departments. FONZ offers employee incentives, leadership opportunities, and the best place to work in town! Stop by the Zoo's Visitor Center for directions to the FONZ Human Resources Office, or call 202.633.8035. We accept applications Monday through Friday, 9 a.m. to 4 p.m., in the HR Office. You may also fax your resume to 202.633.6659, or visit us online at www.fonz.org. FONZ is an Equal Opportunity Employer.



**EVEN AT FOUR TONS,
THIS ELEPHANT IS
NO MATCH FOR
A THREAT THAT'S A
FRACTION OF ITS SIZE.**

THE HERPES VIRUS.

National Zoo scientists recently determined that the herpes virus is behind the deaths of many wild Asian elephants. But with the help of United Airlines, the Zoo was able to set up a research lab in India that is helping to reverse this trend.

With the support of United Airlines, Zoo scientists have traveled the world to protect animals just like the Asian elephant. From Brazil to Japan, and right here in the United States, we've been able to stretch our conservation footprint with United's help.

We'd like to extend our gratitude to this outstanding airline for its support in safeguarding our natural heritage. **The National Zoo would like to thank United Airlines for taking our conservation work—and our scientists—to new heights.**

WEATHER MAN

What happens when it snows at the Smithsonian's National Zoo? Many animals stay indoors, while others—like the giant pandas—remain outside and even play in the snow. But someone has to make sure that the Zoo's roads and walkways are cleared of the slippery stuff. That someone is the Zoo's snow coordinator, Scott Lipscomb.

Lipscomb and his crew clear 1.2 million square feet of paths, passages, and roadways for the public and Zoo staff. When the forecast calls for inclement weather, the snow crew arrives before sunrise, armed with plows, mini-bulldozers, snow-blowers, and "more shovels than Home Depot," says Lipscomb. As year-round assistant building manager at the Zoo, Lipscomb tackles a range of duties, including supervising the disposal of tons of animal waste and maintaining all of the buildings and facilities at the Zoo.

Animal safety is a top priority for Lipscomb, so when it snows, the first path he must clear is the route from Connecticut Avenue to the veterinary hospital—just in case. Then he moves on to the areas used by Zoo visitors, joggers, and commuters.

But many Zoo walkways are too narrow and winding for the heavy equipment—especially Asia Trail. Hard-working staff shovel out every nook, and finish exhausted. "The average person shoveling a driveway might only be doing it a couple hours, and you know how sore and tired you get," says Lipscomb. "Imagine doing it for eight hours or more after a severe snowstorm."

To rev up for the work, Lipscomb holds a "snow rodeo" before the first snowfall to test the equipment—and his crew. The team gathers in a parking lot at the Zoo to clear piles of mulch that substitute for snow. Experienced snow "gurus" demonstrate their skills to the newer folks. It's a rodeo without bucking broncos or trophies. "You win, you get to use a machine," chuckles Lipscomb. "You lose, you get a shovel."

But snow removal is a science that goes beyond just shoveling away, Lipscomb says. He attended a national snow-management conference and learned of new techniques, such as spraying a magnesium chloride solution onto roads and walkways rather than using rock salt. Since the sodium in rock salt can leach into animal enclosures and harm the wildlife, he prefers not to use it. Melted snow can also carry pollutants into local waterways. Lipscomb is looking at ways to minimize these environmental impacts. "There's no simple solution," he says. "It would be nice if we could just let the sun do the work."

—HAYLEY RUTGER



MEHGAN MURPHY/NZP

» In each issue of *Smithsonian Zoogoer*, this "How Do You Zoo?" page will showcase someone who works at the National Zoo. Learn more about careers at the Zoo by visiting the How Do You Zoo? exhibit at the Zoo's Visitor Center. Children ages 5 to 10 can get a hands-on feel for different jobs at the Zoo. The exhibit is open most weekends from 10 a.m. to 4 p.m.



Scientist Francys Subiaul wants to know how other primates, like Kiko, think.

Researchers at the National Zoo's Think Tank delve into the minds of primates

What Are You THINKING?

BY
CINDY
HAN



MEGHAN MURPHY/ NZP

It's a question that has long perplexed and fascinated philosophers, psychologists, and parents of teenagers: How do our minds work?

Perhaps we can't answer that question entirely, but researchers are trying to better understand the processes that make up human intelligence. And one way to determine what makes the human mind unique is by studying the minds of our primate relatives. Scientists at the Smithsonian National Zoo's Think Tank are looking closely at how great apes like gorillas and orangutans think in order to better understand ourselves. And they're letting Zoo visitors watch the research in action.

"Think Tank was originally conceived for this purpose," says National Zoo primate curator Lisa Stevens. "It was developed as an exhibit that would introduce the concept of animal cognition to visitors. Now we have researchers Francys Subiaul and Chikako King bringing science to life at Think Tank. The goal is to give people an appreciation that animals do

What Are You THINKING?

think, and to bridge the distance between other animals and us.”

Monkey See, Monkey Do

When a baby starts to use a spoon to eat, a parent usually demonstrates the basics: hold handle, scoop, move food to mouth. Even if strained peas end up all over the place, we humans are able to pass along the skill with little conscious thought to the multiple physical and mental pro-

cesses involved. First of all, there’s spatial judgment—knowing where the spoon, the food, and the mouth are in relation to one another. There’s also imitation—can Junior follow the steps Mom’s taking? And there’s memory—will he be able to repeat the motion the next time, or the next day?

All of these elements make up “social learning,” which is one way we learn from one another. Whether we’re using a spoon or speaking a language, humans tend to

take social learning for granted. But to evolutionary psychologist Francys Subiaul, social learning is a key element of what makes the human mind unique.

Subiaul wants to shed light on which aspects of human intelligence are shared with other primates. An assistant professor at George Washington University (GWU), Subiaul recently received a \$400,000, five-year grant from the National Science Foundation to conduct cognitive research at the National Zoo. At GWU, his research focuses on how young children process social information, including knowledge acquired from others. But Subiaul needs a point of comparison in order to determine what is unique about human intelligence. That’s why he’s been hanging out with the great apes at the National Zoo’s Think Tank.

What happens when a young ape wants to extract some termites from a mound? Does it learn to use a tool to get its lunch the same way a baby learns to use a spoon? If the ape picks up cues from the others on how to poke a stick into a hole and pull out some bugs, it has engaged in social learning. What Subiaul wants to know is how that learning occurs. His research focuses on how apes approach the processes that make up social learning, such as memory and spatial understanding.

Testing ... One, Two, Three

To do this, he conducts a series of experiments—or “imitation tasks”—by putting the apes in front of a computer touch screen. He has a specially designed apparatus that allows him to display images on the screen facing the animal, while he can interact via a second computer on the other side.

Subiaul studies the Zoo’s western lowland gorillas (*Gorilla gorilla gorilla*) and orangutans (*Pongo pygmaeus*, Bornean, and *Pongo abelii*, Sumatran), both closely related to humans, but slightly different in their behavioral patterns.

Say the research participant is Bonnie, an older female orangutan, who is a veteran of these types of studies (see “Brainy Bonnie,”

Francys Subiaul uses a computer touch screen to test the apes’ learning processes. Some of the Zoo’s orangutans have already participated in cognitive research studies.



MEHGAN MURPHY/NZP



JESSIE COHEN/NZP

below). Subiaul sits on one side of the computer outside the enclosure, while Bonnie faces the touch screen. Most of the great apes participate willingly—not only because they know they will receive treats during the session, but also because they seem to enjoy interacting on the computer.

“We offer our apes free choice of participating in the studies, and they often seek it out,” says Lisa Stevens. “They like getting attention, and they like the challenge.”

Subiaul’s study challenges the animals with three different imitation tasks, all testing how the apes remember or choose images on the computer touch screen. In one task, Bonnie would see several pictures on the screen. Subiaul would then touch a series of pictures in a certain order—such as apple, then boy, then cat—on his screen. Bonnie would see this sequence flash in order on her screen. Then all of the pictures would scramble and reappear on the screen in a dif-

ferent configuration. Bonnie would then have to copy Subiaul, touching apple, boy, cat.

“We’ve found that human children as young as two and a half can do this,” says Subiaul. “This skill shows an ability to learn a simple code from someone else. It’s an example of cognitive imitation. This is a basic learning skill. After all, how would we be able to learn from others if we couldn’t remember the order in which things happened?”

Brainy Bonnie

She’s a longtime participant in research at the National Zoo—and she’s a charmer.

Most parents consider themselves above favoritism. The same goes for the orangutan keepers at the Smithsonian’s National Zoo. But when you work with an orangutan as intelligent and charismatic as Bonnie, a 32-year-old female, it’s tempting to play favorites.

Bonnie’s keepers say her “complex personality” fascinates all who meet her. “She is very observant and never misses a thing,” says Erin Stromberg, a Great Ape House keeper. “She will often come up to the glass and study the visitors on the other side. When there are events on the [Zoo’s] Great Meadow, she likes to climb the O Line and study every facet of what is happening.”

In addition to being observant, Bonnie is playful, creative, sensitive, and people-oriented, according to her keepers. While confident with people, she is more submissive with the other orangutans. Her excellent maternal skills came in handy when sub-adult Kyle arrived at the zoo a few years ago. Bonnie adopted and nurtured him through this time of transition.

Just like a human, Bonnie has her idiosyncrasies. She will imitate the keepers’ activities, cleaning the glass and sweeping the floor for attention. When she is anxious, she will use pieces of a sheet to roll up chewed food or other debris, then chew on her creation, says Lisa Stevens, the Zoo’s curator of primates and pandas.

Science Subject

Over the years, Bonnie has been a long-term partner in cognitive research at the Zoo, participating in several studies. The first began in 1993, when Robert Shumaker, coordinator of the Orangutan Language Project, initiated language research with the National Zoo’s orangutans.

A current study looks at orangutan memory and decision-making, headed up by Karyl Swartz, a Smithsonian Research Associate from the Great Ape Trust of Iowa. For the past ten years, Bonnie and her fellow orangutan Iris have participated in this research program. Today, all six of the Zoo’s orangutans are involved in the project.

Swartz is trying to discover whether orangutans develop an organizing strategy for remembering long lists. Her study uses a

computer touch screen to test the orangutans’ ability to remember the order in which they were shown certain pictures.

According to keepers, Bonnie is one of the brightest and most consistent primates at the Zoo. “Unlike many of the other orangutans, Bonnie is very thorough when she participates in the study,” says Stromberg, who assists with data collection. “Some of the others are less persistent with the tests, but Bonnie will keep trying until she is successful. And she doesn’t like to make mistakes.”

Bonnie is also the feature of a recent scientific paper on which Stromberg is a co-author. The study focuses on Bonnie and her unusual ability to whistle. After hearing a keeper whistling, Bonnie began to mimic the sound on her own. Whistling isn’t a sound in an orangutan’s repertoire, and Bonnie’s spontaneous ability to copy this human vocalization demonstrates that some apes can learn sounds from another species. The findings help scientists better understand the evolution of human speech.

Bonnie and Friends

Born in 1976 at the Albuquerque Zoo, Bonnie was raised in a nursery. She arrived at the National Zoo in December 1980 and is the mother of Kiko. Weighing 142 pounds, Bonnie lives at the Great Ape House and Think Tank with five other orangutans—three females and two males.

Along with male Kiko and females Iris and Lucy, Bonnie is a hybrid orangutan. The Zoo’s other two orangutans—a male, Kyle, and a female, Batang—are Bornean.

Bonnie has many distinguishing features. Along with a large belly, she has a bulbous forehead and a beautiful dark red coat. When the Zoo’s O-line was introduced in 1994 for the orangutans to travel between the Great Ape House and Think Tank, Bonnie was one of the first to use it. Most unique to Bonnie is that when traversing the ground, she chooses to walk on two feet like her human counterparts.

—BY DAN STONE



ANN BAIDGER/NZP

What Are You THINKING?



ANN BATDORF/NZP



JESSIE COHEN/NZP

ABOVE: The Zoo's western lowland gorillas, like Kwame, apply their minds to everyday tasks. **LEFT:** Researcher Chikako King wants to understand how conscious they are of their own decisions.

A second variation on this test adds a little more: The same thing occurs, but this time the researcher taps certain pictures to form a pattern; for example, apple, boy, boy, cat. The ape must remember the order of the pictures, but also the pattern of repetition. To receive a reward, Bonnie would have to tap apple, boy, boy, cat, as well. This tests the great apes' understanding and appreciation of subtle motor skills: Do they notice the double tap? Are they paying attention to that level of detail? Do they recognize that they need to imitate the double tap to be rewarded with cereal or fruit?

The third test requires spatial memory, and is perhaps the most difficult one for the

apes. Instead of memorizing the pictures themselves, the animal must recall the locations on the screen that the researcher touched. Subiaul might point at a sequence of pictures—first in the upper left of the screen, then bottom middle, then bottom right—much like punching in a PIN on a number keypad. Once the images are scrambled, the ape has to touch the same spots on the screen in order, regardless of what pictures show up in those spots.

Subiaul guesses that this will be the most difficult task for the apes to imitate, because it requires them to think more abstractly about space and action. The pattern is based on location, not concrete

images. "My hypothesis is that humans are different from apes in that we have evolved specialized ways to create unique solutions to challenges. We can encode, imitate, and replicate actions," he says. "Other primates appear to acquire some things by observation or cognitive imitation, but the rest they probably learn by trial and error."

Why have humans evolved the mental power to solve problems? Because, Subiaul explains, we're pretty wimpy otherwise. Relative to other animals, our teeth and muscles are weak, we have no protective fur to speak of, and we're unimpressive runners, jumpers, and swimmers. Our complex brains make up for our physical deficiencies in the wild. We have skills like strong spatial memory to help us with basic survival tasks, like locating a good fruit tree, figuring out how to pick the fruit, and remembering how to find the tree again.

Inside the Research

Since Subiaul's research is taking place right at the National Zoo, it's only natural to invite Zoo visitors to witness the work in action. Subiaul and his research team will not only allow Think Tank visitors

to watch the apes participating in the experiments, they will also offer people the chance to participate in the research themselves. Since Subiaul's other work at GWU compiles similar cognitive data on human children, he plans to make it possible for Zoo visitors to sit down at a touchscreen themselves and see how they fare on the tests. Data gathered from Zoo visitors could factor into the study's results.

"Ultimately, our visitors will have a unique experience, as both participants and as observers," says Stevens.

Subiaul will also hold regular seminars at Think Tank, and he'll provide opportunities for local high school students to assist him in his work. He's passionate about sharing his interest in primate cognition.

"This is a big deal because the question of cultural learning has never been addressed or studied this way. But what's even more important is that we can only try to address these questions as long as we have our primate relatives around to study. That's why we need to care what happens to them in their natural environment. We need to care about preserving biological diversity. If we lose our close relatives in the animal world, we lose the ability to better understand ourselves forever."

Apes and Grapes

Another primate study at the National Zoo might help scientists understand humans better. In research conducted by animal psychologist Chikako King, the apes are put to the test by pointing at colored cups instead of computer touch screens.

King's research centers on "metacognition." King describes this tricky concept as "thinking about thinking"—in other words, having a sense of what's contained in your own brain. She gives an example: If you're a student with a big exam the next day, and you've studied thoroughly, you go into the test confidently. This is because you are consciously aware that you remember the facts you've studied. But if you didn't study at all for the test, you would be fully aware of being ill-prepared—in this case, you know what you don't know.

We experience situations every day where our mind must navigate this middle ground of cognition. The questions King asks are: Can orangutans and gorillas monitor their own memory? Do they remember that they

"If we lose our close
relatives in the animal
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remember something? How aware are they of their own mental process?

To answer these questions, King performs a series of tests involving cups and grapes. The ape sits on one side of an acrylic glass panel, while King sets up the parts of the experiment on the other side. She places grapes under some of three cups, then offers them to the participant. The ape can point through one of three holes along the bottom of the acrylic glass panel, indicating which cup it chooses. King lifts the cup to reveal whether there are zero, one, or two grapes underneath. The ape gets the grapes as its reward. When a test is in progress, it looks much like a magic trick.

One test involves King holding up two grapes and showing them to the ape before placing them under one of two blue cups. Then she holds up one grape and places it under a yellow cup. Having seen her do this, the ape tends to choose the blue cup for a two-grape reward.

"I always use red table grapes, which are one of their favorite treats. There should be an incentive to choose two grapes over one," explains King. She notes that the orangutans carry this out more consistently due to previous research experience, whereas she had to spend time at the Zoo's Great Ape House this fall training some of the gorillas to purposefully point at the cup with two grapes.


Another test adds a twist: Instead of showing the apes where the two grapes are hidden, King blocks the ape's view with a box when she is hiding the grapes. She then lifts the box to reveal two blue cups, and places one grape under the yellow cup in full view of the ape. One blue

cup hides two grapes and one has none. The yellow cup hides one grape, and this never changes. Does the animal gamble on choosing one of the blue cups, not knowing if it will find two grapes or none? Or does it pick the "safe choice"—the yellow cup with the one guaranteed grape?

"What I found is that they are more likely to choose the safe choice when they can't see where I hid the two grapes," says King. This indicates that apes use metacognition in gauging what they know they remember. Their decision seems to be based on self-awareness; they recognize their own uncertainty. However, some apes may just be more inclined to gamble. Others like to play it safe. "They're just like people—they have individual personalities," says King.

King gets to know the individual apes over time, since her study requires different versions of experiments in order to gather enough meaningful data. She is always the one to test the animals, in order to maintain consistent conditions. "They have to get used to you," she says. "You just have to spend time with them, feeding them and being around."

Like Subiaul, King finds the apes are usually willing to participate in the studies, even eagerly awaiting their turn. Sometimes they're too eager. "One day I was working with Kiko, one of our orangutans. A young female orang, Batang, was watching from a shelf above and wanted to participate. When I didn't pay attention to Batang, she spat right on me to get my attention!"

Visitors to the Zoo may not catch this sort of action, but they can see King demonstrate her metacognition study at Think Tank and the Great Ape House. She hopes that onlookers will understand that they're watching more than just a fun find-the-grapes guessing game. "This area of study is very new and exciting," she says. "The reason why this is so important is that metacognitive skills are related to self-awareness. What we are really asking is, 'What makes up consciousness?' It's important to let the public see that animals like orangutans and gorillas are very intelligent, and that they seem to have sophisticated cognitive abilities that are comparable to consciousness and self-awareness. We hope that people who recognize this will be more concerned about these animals' welfare, both in captivity and in the wild." 



LESSONS FROM THE Arctic

BY DON MOORE
AND JOSUE CARDENAS

Life in the tundra
teaches high school
students important
lessons about polar
bear conservation and
climate change

➤ **Polar bears are magnificent ice-dwelling mammals,** strikingly beautiful in their large size and white fur. They are uniquely adapted to living on sea ice, which they use as a platform to hunt seals, for seasonal travel and resting, and to find mates, breed, and house their cubs.

The polar bear is now listed as “threatened” by the U.S. Department of Interior, as of last May. It has become the international poster child for climate change action—for good reason: The polar bear population is declining due to its rapidly disappearing sea ice habitat. Although some people still question whether or not climate change is caused by human actions, the majority of scientists on the Intergovernmental Panel on Climate Change have said that humans are contributing to the problem. In light of the need for action, the Association of Zoos and Aquariums (AZA) and Polar Bears International (PBI) partnered to declare 2008 the “Year of the Polar Bear.” Sea ice has declined notably in just the last five years, and Manhattan-sized chunks of Arctic ice floated out of the Arctic Ocean last year. But it’s not just the ice that’s shrinking—so is the time for solutions. A recent study published in *Geophysical Research Letters* found that melting of Arctic Sea ice has reached the point of no return.

The Smithsonian’s National Zoo and other organizations partnering with PBI have raised public awareness about the problems that polar bears are facing in a changing Arctic. The National Zoo’s associate director for animal care, Don Moore, has participated in the PBI educational outreach program for more than ten years, teaching others around the world about what can be done to help save polar bears.

Moore has helped to create “Arctic Ambassador” centers in zoos, and to establish modern standards of polar bear management in those zoos. The National Zoo and others provide student ambassadors for PBI’s “Adventure Learning Program” on board the Tundra Buggy Lodge in Canada.

Polar bears migrate through the Churchill, Manitoba, area each fall. They have used this route for generations to move from the Canadian taiga ecosystem, where the Western Hudson Bay polar bear population lives during the ice-free summer period, to the Hudson Bay itself as it ices up in the winter.

For several months each year, adult polar bears travel far out on the bay ice to stalk and catch seals. A mother polar bear’s torpedo-shaped head fits nicely into seal dens in snow drifts, and bear cubs grow quickly on the mother’s rich milk and delicious seal fat. As the amount of ice decreases due to global warming, polar bears have fewer icy hunting platforms, so they lose weight and have a reduced ability to raise cubs. “Over the last ten years, I’ve witnessed first-hand how the landscape there has changed from ice and snow to just grass all around,” says Moore. “It’s visible evidence of the pressing need for solutions. That’s why it’s so great that we have young people helping us take action.”

The students in the Arctic Ambassador program see and learn about polar bears and their habitat. They are coached by experts in how to teach others about global warming and polar conservation. This year’s National Zoo Arctic Ambassador, Josue Cardenas, 17, was mentored in polar science by Moore and members of the Zoo’s education staff, including Debra Hanibal and Sonja Sugerman. Josue joined other students and PBI’s team of leadership trainers on the Tundra Buggy Lodge in October 2008.

CHILLING WITH THE **Polar Bears**

Like many teenagers, Josue Saul Cardenas has a hard time getting up for school. But before dawn on the morning of his trip to the Arctic, he was wide awake. In fact, he stayed up all night in anticipation of his trip to polar bear country on a stretch of frozen tundra in Churchill, Manitoba, Canada.

Josue’s journey to this wilderness started in warmer surroundings—specifically, the Amazonia exhibit at the National Zoo, where he served as a volunteer last summer.

A senior at Cesar Chavez Public Charter High School for Public Policy, in Washington, D.C., Josue has a strong interest in environmental issues and participates in his school’s green club. Because of this interest, the Zoo chose to help send Josue to join PBI’s Adventure Learning Program, sponsored by an anonymous donor to FONZ as well as PBI. He and a group of other high school students experienced an eye-opening stay in the tundra as they learned about climate change, arctic wildlife, and saw polar bears during their fall migration.

For a week in October, the students lived and studied aboard a series of “tundra buggies”—converted school buses elevated on massive tires that are outfitted with bunk beds or classrooms. During their visit, they explored their surroundings, photographed wildlife, and learned from local people and experts in the field.

During his adventure, Josue recorded his thoughts in a blog for PBI, which is excerpted here:

Friday, October 10, 2008

I was so excited about flying to Canada that the night before my arrival, I could not go to sleep. When I arrived in Canada, I met my fellow PBI Ambassadors. Literally only two of us were dudes.

LESSONS FROM THE Arctic

The night of my arrival there was a slide-show of photos by Robert Taylor, a photographer and friend of PBI. Taylor's photographs of polar bears made me appreciate the art of capturing nature shots.

From a tundra buggy I took pictures of a mother polar bear with her two cubs. It was truly amazing how curious the cubs were. One of the cubs was so curious that it tried to climb the buggy.

Riding across the tundra in Churchill was quite an interesting experience. We drove over dirt roads, making it difficult for passengers to keep their balance; the standing passengers were stumbling back and forth continuously.

Saturday, October 11, 2008

Today I was awakened by Robert Buchanan, the president of PBI, singing, "Oh what a beautiful morning, oh what a beautiful day." And it really was. The PBI Ambassadors and I started working on our presentation about the impacts of global warming

in the Arctic. While I was discussing the presentation with my colleagues, an Arctic hare ran by the window. We all dropped what we were doing and ran to the windows to take photos of it. The hare was so beautiful in how it navigated its environment. It seemed curious about the tundra buggy, running around it a few times.

Later, I took photos of a polar bear. There was a polar bear that was so curious that he started eating trash he found in the tundra. It upset me how a person could leave garbage without thinking about the consequences.

In the afternoon, a group gave a presentation about the impacts of climate change on the plants and animals of the north and also about the people who live and work in the Arctic. The presentation was fun and the group did a good job of showing the impact of global warming on the Arctic. They showed us how the government and corporations choose to ignore these impacts.

Tonight, Robert Buchanan talked to us about the powerful polar bear. It was the first time I had seen a polar bear look so powerful in a photo. The way in which Robert spoke really motivated me and made me want to do more for polar bears.

Sunday, October 12, 2008

Today we saw a polar bear outside the tundra buggy. I was surprised to see the bear so close. The bear was underneath the buggy and only about 60 cm below me. Polar bears are truly one of nature's most beautiful creations.

I learned how a polar bear behaves in its natural environment. It is one of the most curious and playful animals. I learned from Julie Christie, an animal keeper at the Oregon Zoo in Portland, how they take care of polar bears in zoos and encourage their natural behaviors. [Note: The National Zoo does not exhibit polar bears due to a lack of an optimal habitat for them.]



BJ KIRSCHHOFFER

Josue Cardenas (above) visits an abandoned polar bear den during his tundra adventure with fellow high school students.



DON MOORE/NZP

Then Robert Buchanan showed a video featuring a 12-year-old girl [Severn Suzuki] who went to the United Nations to ask world leaders to do more to protect the earth against global warming. Her presentation was very inspiring to me. She was very passionate about protecting the earth, and you could hear that passion in her voice. Today has inspired me to do more to effect change in my community. If we all work together, we can change the whole world.

Tuesday, October 14, 2008

Last night we saw two polar bears fighting—it was like watching a live boxing match. They were so macho. It looked like they were fighting for territory.

Today I saw Churchill from the air. We were really high above it in a helicopter—the first time I had ever been in one. The colors of the land below were magnificent—the green trees, the blue water. It's not what I expected Churchill to look like.

Today we each wrote poems and then read them out loud. Some made me laugh, others touched my heart. It will be a night that I'll never forget. We did a presentation for the adults so we could show them how much they meant to us. They reacted with laughs and hugs. Today is the last night that we'll be here, and I know I'm going to miss everyone very much. I think of them as my family.

Upon his return to Washington, D.C., Josue went to the National Zoo to give a presentation of his experience to a group of his fellow high school students. He told them how he witnessed the disappearing snow and ice in the polar bear's habitat. His call to them was simple: "You can help stop global warming." Saving polar bears starts with simple conservation actions, from taking shorter showers to turning off lights. "You might not think that what's happening in the Arctic has anything to do with you, but every little thing you do to help the environment really can make a difference."

ABOUT Polar Bears



DON MOORE/NZP

» Female polar bears weigh 350 to 550 pounds, while males weigh 775 to more than 1,500 pounds. They make our native black bears, at 150 (female) to 600 (male) pounds, seem petite.

» Front feet can be 12 inches in diameter and are oar-like for swimming, with hair on the undersurface for gripping the ice, acting as "snowshoes" on snow and thin ice, and for thermal insulation.

» Polar bears can outrun caribou over short distances. They can swim three to five miles per hour.

» Polar bears have an acute sense of smell and have been known to sniff out food or mates from miles away.

» Their diet includes ice-breeding pinipeds, such as ringed seals, bearded seals, and walruses. Polar bears eat mostly the blubber of these animals.

» "Play" is an activity bears do with other bears (or with bushes!) to help coordinate their reflexes, to establish relationships, and to help them learn skills like hunting and fighting.

» The Inuit term for "bear" or "ice bear" is *nanook*.

» Scientists believe a brown bear ancestor was at the beginning of the polar bear's evolutionary tree about 200,000 years ago. The polar bear is the "youngest" of the eight bear species on Earth.

For more information, visit www.polarbearsinternational.org.

Learn more about polar adventures on the Tundra Buggy at www.FrontiersNorth.com.



BJ KIRSCHHOFFER



BJ KIRSCHHOFFER

Enrichment
offers
animals
variety and
stimulation
in their
daily lives

mixing IT UP

BY LINDA LOMBARDI

It's morning at the Smithsonian National Zoo's sloth bear

exhibit, and keeper Jenny Spotten arrives with an armload of shoeboxes. She sets them down and begins to fill a shoebox with mulch. Then she mixes in a handful of food—some fruit, nuts, special bear chow—and closes the shoebox lid. She places the box in a certain spot within the exhibit, then puts a log on top of it. She proceeds to climb around the entire exhibit, tucking food into decaying branches, nooks in rock walls, and mulch pits.

Why is Spotten going to all this effort? Because she's offering the four sloth bears more than just breakfast—she's providing them “enrichment” to stimulate their bodies and their minds. “I could dump a bucket of food in one place, but then five minutes later, the bears would have nothing to do,” she explains. Instead, the bears are given the opportunity to search and forage for their food, similar to the way they might in the wild.

Enrichment is central to what zookeepers do each day to keep animals active and engaged. It includes the wide variety of activities and objects that keepers offer to present mental and physical challenges to the animals.

The goal is to encourage natural behavior and give animals options—getting them to use their senses, exercise their bodies,

and interact socially in species-appropriate ways. Heidi Hellmuth, the National Zoo's curator of enrichment and training, says that keepers have historically offered zoo animals enriching activities, but a well-defined idea of enrichment didn't really take off until the 1990s. Now, the Association of Zoos and Aquariums requires accredited institutions like the National Zoo to include enrichment in their basic standards. “Now we understand that it's not a separate part but an integral aspect of animal care,” she says.

Hellmuth is working on formalizing enrichment goals for every species at the National Zoo, and she says that what's particularly significant is that the goals will include categories of behaviors to encourage. These include sensory, social, and cognitive



Keeper Jenny Spotten adds a sweet incentive to the sloth bear's enrichment activity.

MEHGAN MURPHY/NZP

MEHGAN MURPHY/NZP



behaviors, as well as methods to elicit them, such as the use of objects and the design and furnishing of exhibits. Keepers will have the freedom to decide how to get animals to perform desired behaviors, such as foraging. “It’s an approach that we haven’t heard of any other zoo taking,” she says. “We’re hoping to raise the bar.”

One category that’s particularly multifaceted is dietary enrichment, as with the sloth bears. Mealtime is when many daily enrichment activities take place, for obvious reasons. Not only is much natural behavior related to seeking food, but animals have to eat anyway, so why not multitask? The most basic dietary enrichment involves varying certain elements of the actual diet—apples one day, bananas the next. But food can also be used to present cognitive and physical challenges; for example, the sloth bear has to figure out where the food is and then dig it out, encouraging a variety of natural behaviors.

Of course, in the wild a bear would more likely be tearing bark off of branches than cardboard off a box. Since it’s impractical to provide an endless supply of trees, creative artificial alternatives can serve the same purpose. You’ll see this all over the Zoo: an octopus searching for a piece of shrimp in a plastic puzzle, marmosets digging for mealworms that have burrowed among the strings of a mop, great apes searching for treats through bags and in plastic toys.

Dietary enrichment often keeps things more interesting for the keepers as well as the animals. At the Zoo’s Bird House, keeper Mario Reyes cuts the top off an apple, digs it out like a jack-o-lantern, and fills it with mealworms or waxworms. He’ll freeze treats inside of ice cubes, and cut slits in a whole banana to insert nuts for parrots or half-frozen newborn mice for magpies. They’re combinations that you’d never see in the wild, but like the bear’s shoebox,

they have the desired effect when the birds are looking for food, he says: “They have to work at getting it out.”

Beyond meal-based enrichment, a similar type of enrichment can be done to stimulate the animals’ senses. One of the Zoo’s tigers, Rokan, exercises his keen sense of smell one morning as he checks out his yard. Keeper Kristen Clark has sprayed catnip in various spots in the yard. She’s also spread around droppings from zebras and gazelles (readily available materials at the Zoo), which are similar to the tiger’s prey in the wild.

At an especially delectable spot, Rokan stops and stands with his mouth hanging open—a pose you may have seen in house cats. This behavior, called the flehmen reaction, displays Rokan’s use of what’s called a Jacobson’s organ in the roof of his mouth in order to take in a smell. Clark explains: “By making that face, he’s moving the scent across that organ.”

There’s a reason
that zoos
have replaced
old-fashioned
bare cages
with **complex**
naturalistic
exhibits.

Sometimes food isn’t all that matters. Many animals must have companions to hang out with in order to be healthy—they need social enrichment. Zoos were once much like stamp collections; the goal was to have one each of a large variety of species. Now it is recognized that some animals have to live in social groups, like families, for their own well-being. Zoos today tend to keep fewer species, to make room for more individuals of each species.

Social life often means getting out and meeting new folks. The cheetahs, for example, are frequently moved to different enclosures where they can see different cats in the adjacent yards. This kind of social enrichment can also be valuable for species like the giant panda that are usually considered to be fairly solitary, says giant panda curator Lisa Stevens. “We’ve discovered here that we can house our adults together,” she says. While giant pandas are not known to pursue social interactions in the wild, Stevens points out that scientists don’t have enough evidence of what actually happens in the animals’ natural environment. “The play sessions are quiet, it’s a dense understory, and what’s the likelihood that someone has seen it? The field research hasn’t been done,” she says.

Just as people want to have a say in their social interactions, an important part of any kind of enrichment is giving animals choices and some control over how they spend their time. Giving the pandas the opportunity to interact does exactly that, says Stevens: “It gives them another choice. Even if they only play together for a couple of minutes, it’s a choice they’ve made.” Choice is important because otherwise, she says, “we take away the unpredictable aspect of their life in the wild.” Because novelty and choice are important to enrichment, keepers maintain logs to make sure that enrichment items like scents and objects are varied each day.

But enrichment isn’t only about things that change: it starts with the animal’s basic living space. A good animal exhibit is one that meets many enrichment goals at once. There’s a reason that zoos have replaced old-fashioned bare cages with complex naturalistic exhibits, and it’s not just for the aesthetics. The different pools and streams for the otters at Asia Trail, for example, beautify the exhibit, but they also give the

LOOK FOR A SIGN — New signs all around the Zoo invite visitors to learn more about enrichment. If you see a **WHAT’S THAT?** sign near an animal exhibit, you can call the posted phone number and hear a recording of a keeper explaining a specific enrichment activity. Get fascinating inside info on how the antelopes act around log piles, why the toucan needs a training crate, and more. Also, go to <http://nationalzoo.si.edu/goto/enrichmentphotos/> to view animal enrichment photos at the Zoo.



Zoo animals like the cuttlefish and the golden lion tamarin receive challenging objects and sensory stimuli. The octopus interacts with a ball, and the tiger investigates a "bloodsicle."

animals a choice of water that's deep or shallow, heated or unheated. And the otters clearly think that the plantings are more than decoration. "You'll see them running around with big tufts of plants in their mouths," says curator Tony Barthel.

An enriching exhibit offers the animals opportunities to perform their natural behaviors. At the Bird House, the brush is intentionally left to grow dense in the

cassowary yard. This encourages the large bird to use its casque, the bony structure on its head, to push through the foliage like it would in the wild. And in a building like the Small Mammal House, every branch, vine, and stone in an enclosure was placed there by a keeper who was thinking about the animals' behavioral needs.

"An animal-appropriate environment promotes healthy behavior," says Stephen

Schulze at the Zoo's Small Mammal House, where exhibits are designed to encourage natural food-gathering and social behavior. An exhibit for small, arboreal tree shrews, he points out, includes plenty of skinny branches for climbing—and they're designed to have a little bit of give, like real trees, instead of being immobile. Chunky mulch not only resembles the forest floor visually, but allows mealworms

mixing IT UP

to burrow down into it, where shrews can forage for them. And in a nearby enclosure, the meerkats' rocky exhibit features hilly areas so that the animals can carry out their instinctive guarding behavior. "The idea of providing different heights satisfies their group behavior of posting someone who's on guard," Schulze says, pointing to the animal sitting on its haunches, looking around.

Enrichment means not only paying attention to how an exhibit suits a particular species, but how it caters to an individual animal as well. For one aged, blind coati at Small Mammals, Schulze says he keeps the exhibit stable and safe, without the novelty and stimulation a younger animal would require. At the Bird House, one parrot is reluctant to fly, so the keepers have had to take special steps to encourage it. "We put

Enrichment and training curator Heidi Hellmuth—holding some almost-indestructible balls—is setting enrichment goals for every species at the National Zoo.



stuff in to make him have to fly if he wants it," says keeper Gwen Cooper. They've also modified the exhibit so the perches aren't all connected: "Now he has to at least fly from one perch to the other."

These solutions may seem obvious, but not all behavioral needs are clear, even to the Zoo's animal experts. Biologist David Kessler cites one instance in which the Small Mammal team was trying to figure what to do to get a rock hyrax to move around more. They had to do some research into the published literature and found that hyraxes in the wild stay still most of the time. "So the hyrax was actually doing just fine," says Kessler.

In some cases, the Zoo's keepers and curators do research of their own to determine the animals' enrichment needs. When the Invertebrate Exhibit acquired five baby cuttlefish, museum specialist Tamie DeWitt and her colleagues wanted to learn more about them. DeWitt started by making a list of some of their known and observed behaviors. This list included not only swimming, resting, and waving their arms, but also changing the colors and patterns on their skin—something not many other creatures can do.

"They're highly visual," she says. "We'll try changing backdrops—will stripes make them do stripes?" She watches as a volunteer, her arm submerged in water, patiently offers a piece of shrimp on the end of a fishing line to a cuttlefish with a square white patch on its back. As she wiggles the shrimp, the white patch goes dark for a moment. A light square with three stripes radiating from it appears and flashes on and off, and then the pattern settles down to the original white patch again.

This sort of experiment helps DeWitt, invertebrate curator Alan Peters, and Hellmuth figure out how cuttlefish behave in order to test out new enrichment strategies and track their reactions. These research efforts are needed because there's no textbook on how to enrich a cuttlefish.

Whenever Zoo staff come up with new enrichment ideas for the different animals, frequent follow-up testing and evaluation of the methods is essential. You can't always predict what will happen when an enrichment item meets an animal. In one example, a hard, thick plastic ball was considered a good product to use to stimulate some of the

animals to play. "The manufacturer of the ball used to call it 'the indestructible ball' until someone gave it to a lion," says curator Hellmuth. "Now they call it 'the almost-indestructible ball.'"

The balls can usually be used for a couple of years, according to keeper Clark, but they won't stand up to a big cat indefinitely. A retired ball that she hauls out of a storage space is raked with claw marks and has a ragged-edged hole in it. "We have to take the ball away," explains Clark. "A lion could get a tooth stuck if it tried to carry the ball in its mouth."


But despite occasional glitches, enrichment is more useful than troublesome. It can be used to solve specific behavior problems. Reyes at the Bird House says that adding different juices to the nectar fed to honey-eaters means it's easier to give them medication in their food, because they're used to new flavors. In another example, a red ruffed lemur named Ceres at the Small Mammal House lost her mate, Nike, so she stopped eating and was losing a dangerous amount of weight. Until a new mate could arrive, keepers employed many enrichment methods to meet her social needs: Ceres was housed with other animals, had a stuffed animal that she groomed and slept with, and got extra attention from the keepers. She also had a TV that played videos of nature programs. Ceres not only started eating and gaining weight, says keeper Rebecca Smithson, but she responded to the enrichment activities in other ways as well. She would react to the TV programs, showing that the stimulus succeeded. "When lemurs vocalized, she vocalized back," says Smithson. "She hadn't vocalized since Nike died."

Whatever the activity, it all comes back to ensuring a high quality of life for the animals at the Zoo. To do this, keepers look at things from the animal's point of view. Keeper Spotten watches a sloth bear rip into a shoebox of hidden food and smiles with obvious affection. "Their natural instinct is to go around and destroy stuff," she says. "It's just way more fun for a bear to do that than to pick up nuts off the ground and eat them." ■

— LINDA LOMBARDI is a freelance writer who has worked as an animal keeper at the Smithsonian's National Zoo.

JESSIE COHEN/NZP

WHERE
IN THE ZOO?Can you tell
what this is?

What animal has this texture, pattern, and color somewhere on its body? Make your best guess, then visit <http://nationalzoo.si.edu/goto/whereinthezoo> to check your answer and learn more about this Zoo creature. You might be surprised! 



JESSIE COHEN/ NZP

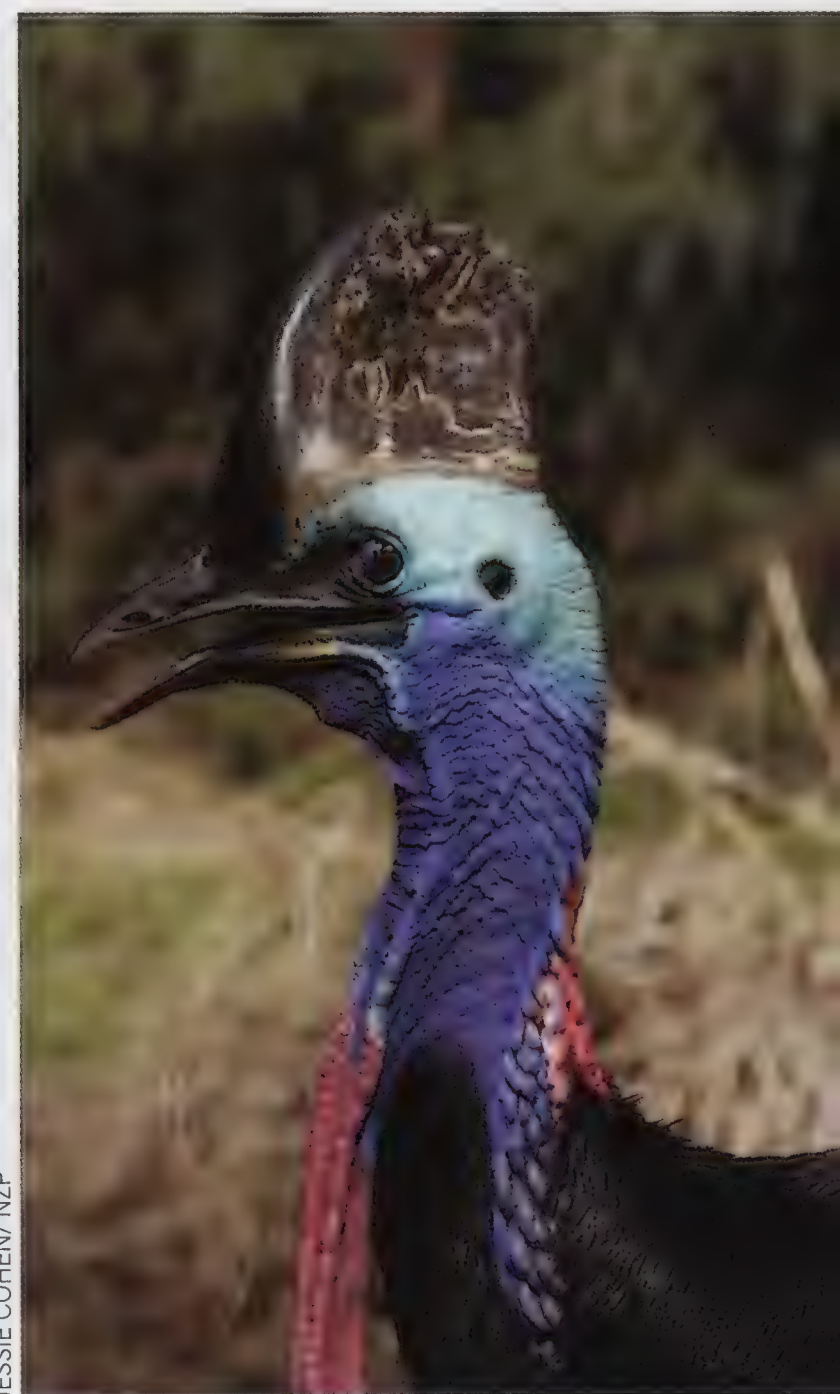
DID YOU
KNOW?

Some animals eat dung.

The animal kingdom is full of potty mouths. Numerous insects, fish, mammals, crabs, and other species eat their own feces. The most dedicated dung-eaters—rabbits, hares, and pikas—devour their own poop in order to double-digest plants made chiefly of fiber. That way they get a second round of nutrition from the plants. Rats, guinea pigs, chinchillas, and other rodents also dine on dung, a habit scientists call “coprophagy.” The Smithsonian National Zoo’s naked mole-rats make soft feces

that they immediately eat. Then they leave a second batch “that, I reckon, is less tasty,” says Zoo small mammal biologist David Kessler. Some animals even share. Young elephants eat their mothers’ dung, which is packed with beneficial bacteria that help them digest plants. Hippos flick their tails underwater, spreading dung to hungry fish. Some predators eat poop to alter their scents and fool their prey. Either way, eating your least-favorite veggies has never sounded more appealing.

—HAYLEY RUTGER



JESSIE COHEN/ NZP

SUPERLATIVE
Boom Box

A bird with a seriously big sound? Double-wattled cassowaries (*Casuarius casuarius*), one of the world’s largest birds, can produce sounds that rival those of the world’s largest mammal, the blue whale.

The deep booming communication calls of the cassowary can reach frequencies as low as 23 hertz, making them barely audible to humans. In dense rainforests where the birds live, lower-frequency sounds travel better over long distances than high-pitched ones.

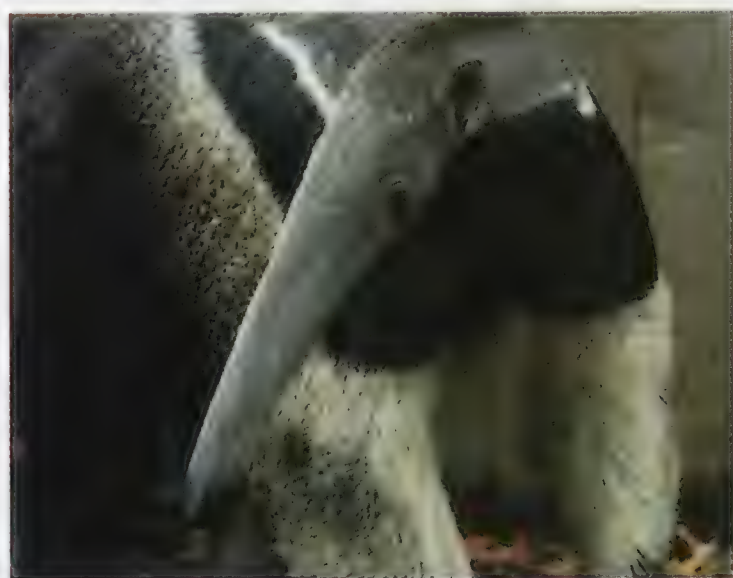
Though the size of the cassowary—up to six and a half feet tall and 128 pounds—helps the bird produce its call, scientists believe the cassowary’s bony helmet, called a casque, helps it receive low-frequency calls from other birds. The casque is filled with air pockets and covered in keratin (the hard protein structure in horns), so it acts like a large microphone.

—CAITLIN LUKACS

FACT
OR
FICTION?

**Ant-eaters
suck in
bugs
with
their
long
noses.**

A giant anteater’s (*Myrmecophaga tridactyla*) long snout isn’t a super-nose—it’s actually a mouth. What looks like a nose is really a pair of long skinny jaws that encase the animal’s tongue—which can be up to two feet long and can dart out 160 times per minute. When an anteater wants to eat ants or termites, its tongue ensnares the insects with sticky saliva and tiny spines. Lacking teeth, the anteater crushes insects between its tongue and the roof of its mouth. Its specialized skull and jaw help it eat at lightning-fast speeds and capture worker ants before getting bitten by nearby soldier ants.



MEHGAN MURPHY/ NZP

At the National Zoo, giant anteaters Dante and Maripi use their unique mouth-tongue combo to munch on insect-eater pellets, fruit, crickets, and termites. Maripi loves to lap up peanut butter—and with such a long roof on her mouth, that can be a sticky situation!

—HAYLEY RUTGER



MYSTERY Mammal

What do you get when you combine a bison's hairy body, a moose's big nose, wildebeest horns, and a bear's tail? A **takin** (rhymes with "walk in"). This mixed-up looking animal is actually related to goats, but is commonly referred to as an ox. It may look funny, but its looks help it survive in the wild.

GET NOSY » During the long winter months in the Himalayan Mountains, the takin's nose knows how to keep the chill out. Takins have super-sized nostrils that heat up air as it enters their bodies. Also, when it gets really cold, takins don't need to shop for a winter coat—they just grow one. This second coat is thick and waterproof. Takin skin oozes oil that coats the animal's hair and makes snow and water slide right off!

ROCKIN' TAKINS » Takins travel up and down steep mountains to eat their fill. They follow the same path over and over, wearing permanent

trails into the landscape. And they don't even need safety gear. Despite their large size, they can leap gracefully from rock to rock. With hooves that act like built-in rock-climbing shoes, they can hold on and keep their balance. They can also jump six feet from a standing start—boing!

TRAIL MIX » Takins will eat any plants within reach, pushing over small trees to bring leaves closer or balancing on their hind hooves to reach high plants. And because takins often eat on the run, their stomachs are built for efficient digestion. They chew up food quickly, swallow, regurgitate it



TAKIN FAST FACTS

SCIENTIFIC NAME: *Budorcas taxicolor*

WHERE THEY LIVE: China and along the eastern Himalayan Mountains, Asia

LENGTH: 5 to 7 feet

HEIGHT: 3 to 4 feet tall at the shoulder

WEIGHT: Up to 550 pounds for females and 880 pounds for males

LIFE SPAN: 12 to 15 years in the wild and 19 years in zoos

HORNS: Grow up to 25 inches on both females and males



later, chew it again, and then swallow it again. This might not sound appetizing, but by eating this way they break down more of the plant material and get more nutrients.

TAKINS IN TROUBLE » Because takins live high in the mountains of Asia, scientists don't know much about them. What they do know is that takin numbers are declining, mostly because of habitat loss due to farming, logging, and mining. However, in China they are considered a national treasure, and there are two reserves there where they are protected. The Smithsonian's National Zoo is doing its part by studying the takin at our Conservation and Research Center in Front Royal, Virginia. Zoo researchers use what they learn about takins to help conserve them in the wild.

—BY PAM BUCKLINGER

Year of the Takin?

Chinese New Year celebrates the Year of the Ox, starting January 26 — but are we really celebrating the takin?

Because the animal's native range is in China and it has long held a special place in Chinese culture, it's likely that we're actually talkin' takin when we honor the ox.

Legend has it that the 12 animals of the Chinese zodiac were chosen by the Jade Emperor, who declared that there would be a race to determine which animals would be honored in his new calendar system. On the day of the race, Ox was in the lead, but at the last minute, Rat jumped onto his horns and leaped across the finish line first. In the end, the 12 fastest finishers of the Chinese New Year race were: Rat, Ox, Tiger, Rabbit, Dragon, Snake, Horse, Sheep, Monkey, Chicken, Dog, and Pig.



Now-We're-Takin Salad

Kids, toss a mixed-green salad with some Asian dressing and gobble up your vegetables like a hungry takin! Pick veggies with your parents at your local farmers' market or store, clean the greens (a salad spinner is always fun), mix, drizzle dressing, and top with garnish.

SALAD:

2 bunches of greens, rinsed and drained (Try arugula, baby spinach, mesclun mix—it's fun to change this depending on what's in season. And remember: Takins love variety!)

- 1 tomato, cut into wedges
- 1 red pepper, sliced into strips
- 1 cucumber, sliced into rings
- 1 cup chow mein noodles

DRESSING:

- ¼ cup vegetable oil
- 2 tablespoons rice wine vinegar
- 1 tablespoon soy sauce
- 1 teaspoon toasted sesame oil

Combine all of the ingredients in jar with a lid and shake well. Toss with vegetables, and top with chow mein noodles. Chill, then munch!



BY MARY-
RUSSELL
ROBERSON



ISTOCKPHOTO.COM

{ CONSERVATION STATION }

Oceans of Plastic

As much as 60 to 80 percent of the plastic debris in the ocean comes from land. A bag or bottle top on a street in Kansas can be washed into a storm drain, which dumps it into the nearest creek, which leads to a larger stream, which leads to the Mississippi River. Next stop: Gulf of Mexico. Lightweight plastic trash can also blow out of garbage cans, trucks, and landfills and follow the same pattern.

A staggering three million tons of plastic trash is bobbing in the swirling currents between Hawaii and California in the North Pacific Subtropical Gyre. In the Atlantic Ocean, plastic debris has been documented in every 10-degree latitude belt from the Antarctic Peninsula to north of the Arctic Circle. Plastic trash, nets, and rope can kill sea birds, turtles, fish, and other marine animals that eat the plastic or become entangled in it.

What can you do?

- Dispose of your trash in a garbage can with a secure lid.
- Choose products packaged with little or no plastic.
- Use fewer disposable plastic products. Instead, choose canvas shopping bags, reusable water bottles, and reusable storage containers.
- If you use exfoliating products (scrubbing lotions), choose those containing biodegradable “scrubbers” such as seeds or ground-up husks. Scrubbing products that list “polyethylene” on the ingredient label contain tiny plastic beads that go down the drain when you wash your face. The beads are too small to be filtered out by most sewage treatment plants, which means many of them end up in the ocean.

[RESEARCH REPORT]

One for Me, One for You

If an elderly woman dropped a coin, would you help her pick it up? You probably would, because humans are altruistic—that is, we offer help and support to others without any expectation of payback. Does altruism exist in other primates? And if so, what motivates this behavior? Philosophers, scientists, and animal-lovers alike have been debating these questions for ages. A new study adds to the conversation by showing that brown capuchin monkeys (*Cebus apella*) are motivated to provide food to related or familiar monkeys.

In one study, researchers offered female monkeys two different tokens. One token resulted in a treat, such as an apple slice, while the other token provided the monkey with two identical treats—one for the monkey and one for another female in an adjoining cage.

Sure enough, the monkeys were much more likely to pick the token that resulted in a treat for two—as long as the second monkey was a relative or very familiar. When the second monkey was a stranger, the first monkey picked the treat-for-two token less than half the time.

The study’s researchers, based at Yerkes Primate Center at Emory University in Atlanta, concluded that seeing a familiar monkey receive or eat a treat served as a reward to the monkeys who picked the treat-for-two option.



PETE OXFORD/NATUREPL.COM

Check this FONZ
section in each issue
of Smithsonian

Zoogoer for important
member news about
Zoo events, classes,
camps, and more.

For more
information, visit
www.fonz.org.

FONZ Resources
www.fonz.org

Membership information
202.633.2922

FONZ special events
202.633.4470

Development office
202.633.3033

Corporate membership
202.633.3044

Camps and classes
202.633.4470

Volunteer services
202.633.3025

Comments? Questions?
Please e-mail us at
member@fonz.org

UPCOMING EVENTS:

Woo at the Zoo

February 12, 6 p.m.-8 p.m.

Celebrate Valentine's Day with a unique date idea—a night at the Zoo! Stroll together through your favorite exhibit and learn about how the animals attract their mates. Light fare and cocktails available. For more information, visit www.fonz.org/woo.htm.

Cockadoodle Zoo

March 14

We're hosting this popular family event earlier this year in order to offer more engaging activities throughout the year.



EVENT WRAP-UP:

WHAT A TREAT »

Many thanks to our **Boo at the Zoo** sponsors:
BIG 100.3 FM, Comcast, FedEx, Fujifilm,
HOT 99.5 FM, Life Savers Gummies®, Mars, Inc., NBC4,
Potbelly Sandwich Works, Rite Aid, 97.1 WASH-FM,
Washington Parent, Whitmore Group,
98.7 WMZQ-FM, Yellow Book.



« A BRILLIANT ZOOLIGHTS

ZooLights was a shining success! Thank you to Pepco for powering the displays, which were made up of energy-saving LED lights. We are grateful to our ZooLights sponsors: Pepco, Comcast, Giant Food, goingoutguide.com, KidsPost/The Washington Post, News Channel 8, Rosenthal Jaguar/Land Rover, SunTrust Bank, United Airlines, Wal-Mart, Whitmore Group, WJLA-ABC7, and WTOP Radio 103.5 FM.

Congratulations to **Aubrey Taradash**, 8, who won the kids display contest with her design of a cuttlefish.

FONZ CLASSES

ADULT/CHILD CLASSES

» These programs are designed to allow adults and children to discover the Zoo together. All children must be accompanied by an adult. For the safety and enjoyment of everyone, unregistered children and siblings may not attend—with the exception of infants who are not yet crawling.

Children's classes and programs are open to FONZ members at the household level and higher categories only. All classes meet in the Visitor Center unless otherwise noted.

Register online at:
www.fonz.org/classes.htm.

Panda-monium!

Come and meet the Zoo's pandas and learn all about their world through hands-on activities and crafts. You'll find out just how colorful black and white can be!

AGES 2-3 (with an adult)

DATES Session 1: January 31
Session 2: February 1

TIME 10-11:30 a.m.

FEE \$25

Moo at the Zoo

Bleats, moos, and oinks are just some of the sounds you'll practice as you make special crafts and sing songs to learn about our farmyard friends. Then take a trip to Kids' Farm to meet these lovable creatures.

AGES 2-3 (with an adult)

DATES Session 1: February 21
Session 2: February 22

TIME 10-11:30 a.m.

FEE \$25

Jig-a-Long Zoo

Each week, you and your toddler will visit different animals, learn about the sounds they make, admire their beautiful colors, and see how they move around. Your child's interactive introduction to animals will involve music and movement.

AGES 2-3 (with an adult)

DATES Session 1: February 23;
March 2, 9, 16, 23
Session 2: February 25;
March 4, 11, 18, 25
Session 3: February 26;
March 5, 12, 19, 26
Session 4: February 27;
March 6, 13, 20, 27

TIME 10-11:30 a.m.

FEE \$100

Heads or Tails

Ever wonder what it's like to carry around a full rack of antlers or ears three feet wide? Observe animals from headgear to hooves, then create your favorite animal's ears, nose, tail, or feet and try them out.

AGES 3-5 (with an adult)

DATES Session 1: February 26;
March 5, 12, 19, 26
Session 2: February 27;
March 6, 13, 20, 27

TIME 1-2:30 p.m.

FEE \$100

Creature Features

Explore animals from horns to hooves as you take part in hands-on activities and crafts to find out what makes different animals special. Then meet some of the Zoo's most decorated creatures!

AGES 2-3 (with an adult)

DATES Session 1: March 7
Session 2: March 8

TIME 10-11:30 a.m.

FEE \$25

Fascinating Flamingos

Flap your wings and fly on over to the Zoo to learn about some of the world's brightest birds. Practice being a flamingo as you stand on one leg and visit them at the Bird House.

AGES 2-3 (with an adult)

DATES Session 1: March 21
Session 2: March 22

TIME 10-11:30 a.m.

FEE \$25

CHILDREN'S WEEKEND WORKSHOPS

» Children's workshops are for kids ages 4 to 14. Specific ages are indicated in each class listing. Parents are not encouraged to stay with the class, but may if they wish. There is no charge for an adult who attends with a child.

Mythical Creatures

Celebrate Chinese New Year as you learn about dragons and other mythical creatures. Use your imagination as you take a magical journey and visit the real animals behind the mysteries.

AGES 6-9

DATE January 25

TIME 10 a.m.-noon

FEE \$28

Perfect Pandas

Learn about some of China's most amazing animals as you celebrate Chinese New Year with the Zoo's pandas! Make your own Chinese New Year decorations before visiting the Zoo's black-and-white and red pandas.

AGES 4-5

DATES Session 1: January 31
Session 2: February 1

TIME 10 a.m.-noon

FEE \$28

Animal Leaders

Male lions defend their pride, silverback gorillas protect their troop, and a single male oryx may lead a herd of 40 animals. Come and meet the great leaders of the African animal world to celebrate Black History Month.

AGES 4-5

DATES Session 1: February 7
Session 2: February 8

TIME 10 a.m.-noon

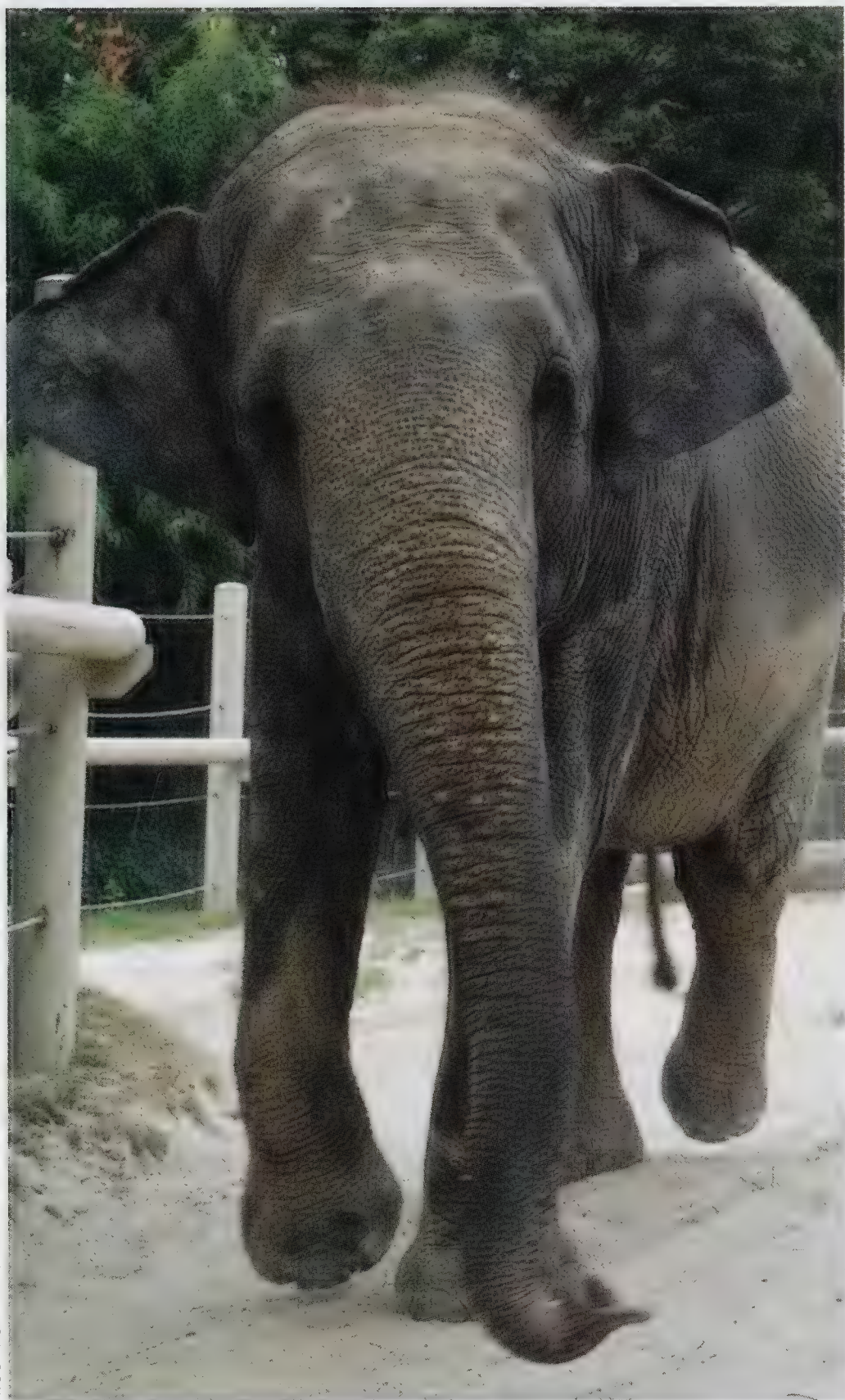
FEE \$28



JESSIE COHEN/NZP



JESSIE COHEN/NZP



Animal Training

Children are not the only ones who are being taught at the National Zoo. Elephants and sea lions, along with many other animals, receive special instruction from their keepers. Discover the hows and the whys of animal training and see the keepers in action.

AGES 7-10
DATES Session 1: February 14
 Session 2: February 15
TIME 10 a.m.-noon
FEE \$28

Going Ape!

Swing over to the Zoo to meet our closest relatives—the apes. From gorillas to gibbons, we have a lot in common with our primate cousins. There'll be no monkeying around in this interactive class.

AGES 4-5
DATES Session 1: February 28
 Session 2: March 1
TIME 10 a.m.-noon
FEE \$28

Girl Power!

Celebrate Women's History Month by learning about females who make a stand in the animal kingdom. From lionesses that hunt for their families to kiwis that lay enormous eggs, these females make extraordinary achievements.

AGES 4-5
DATE March 7
TIME 10 a.m.-noon
FEE \$28

Animal Builders

Birds build nests, bees build hives, and beavers build dams. Find out how these structures help animals survive as you build your own special structure in this class about the art of animal construction. Then head on down through the Zoo to meet some of the animal world's best architects.

AGES 4-5
DATE March 15
TIME 10 a.m.-noon
FEE \$28

Going Green

Want to make a difference to help our animal friends? Find out how easy and fun it is to reduce, reuse, and recycle as you make cool crafts and visit the animals that you are helping.

AGES 6-9
DATE March 15
TIME 10 a.m.-noon
FEE \$28

HOME-SCHOOL CLASSES

• These programs are designed for children educated in a non-school setting. They are interactive, in-depth classes that focus on animal care, conservation biology, and zoological research.

Ancient Trails

From bugs to birds, wildebeest to whales, many animals undertake long journeys. Find out why they travel and how human activities help or harm them. Meet animals that migrate and find out how the Zoo is protecting them. Students should bring a snack.

AGES 7-11
DATES February 24;
 March 3, 10, 17, 24
TIME 10:30 a.m.-1:30 p.m.
FEE \$175

Dinosaur Discovery!

Millions of years after their demise, these once-mighty rulers of the Earth continue to capture our imagination. Investigate the legacy that dinosaurs have left behind for curious young naturalists as you examine animals found at the Zoo. This class includes a visit to the Smithsonian National Museum of Natural History.

AGES 5-7
DATES March 4, 11, 18, 25; April 1
TIME 10:30 a.m.-12:30 p.m.
FEE \$125

Get a jump on registering for our camps and overnight programs! FONZ members at the Contributing level (\$100) and higher can register one week early for Nature Camp and Summer Safari Day Camp. Priority camp registration begins on January 27, instead of February 3.

Contributing Members can also sign up for any Snore & Roar program one week early, on March 31.

If you aren't already a Contributing Member, you can upgrade your membership today at www.fonz.org/upgrade.htm.

A wild week of nature exploration for children entering grades K-5



Summer Safari campers at the Smithsonian's National Zoo explore the lives, habitats, and conservation of animals around the world. Week-long sessions include exciting hands-on activities, craft projects, science experiments, and walks through the Zoo (but there is never direct contact with the animals). Summer Safari Day Camp is an award-winning camp accredited by the American Camp Association.

AGES: Camp sessions are grouped into three grade levels: K-1, 2-3, and 4-5. Summer Safari is not offered at the pre-K level. Children should be registered for the grade level they will be entering in the fall, and they may be registered only within their correct age group.

Due to limited capacity, we reserve our full-day programs for older children. Sessions for campers entering grades K-1 are held from 9 a.m. to noon only. No After-Camp Care is available for this age group.

DATES/TIMES: Weeklong sessions are held Monday through Friday, 9 a.m. to noon or 9 a.m. to 3 p.m. Camps are offered from June 15 to August 7. Campers must be dropped off between 8:45 and 9 a.m. After-Camp Care is offered in the Visitor Center classrooms from 3 to 6 p.m., after full-day sessions only.

FIVE-DAY SESSIONS:
(Weeks 1 - 8)
9 a.m.-noon sessions: \$210
9 a.m.-3 p.m. sessions: \$315

WHERE: Sessions are held in classrooms throughout the Zoo. Please allow extra time in the morning if you have children attending sessions at different locations. For class locations, check online at www.fonz.org/camps.htm (locations subject to change).

Please pick up campers in Parking Lot A. Campers in After-Camp Care must be picked up in the Visitor Center classrooms.

FEES: A current FONZ Household Membership or higher is required to participate. Join online at www.fonz.org/join.htm.

AFTER-CAMP CARE: Available from 3 to 6 p.m.; only for those enrolled in full-day sessions. An additional fee will be charged after 6 p.m. Cost is \$115.

CANCELLATION POLICY: Cancellation requests received at least four weeks before the session will receive a 75 percent refund. Please email the FONZ Summer Safari Office at FONZ_programs@si.edu. No refunds or changes will be made for less than four weeks notice.



JESSIE COHEN/NZP

Registration begins February 3 at 10 a.m.
To register, go to www.fonz.org/camps.htm.
Space is limited!

Upgrade to Contributing Membership or higher and register for camp one week early, starting January 27.

All confirmation materials will be sent via email upon registration.

Week 1: June 15-19

» ENTERING GRADES K-1

Panda-mania Pandas are one of the world's rarest animals. Spend the week with our black-and-white (and even red) pandas and find out what makes these lovable creatures so colorful.

TIME: 9 a.m.-noon

Ele-fun Elephants walk on their tiptoes, can weigh more than 10,000 pounds, and have a nose that can be used as a sprinkler. Follow the herd and learn about the largest living land mammal.

TIME: 9 a.m.-noon

» ENTERING GRADES 2-3

Calling All Cats Hunt with lions, pounce with tigers, and learn all about great cats. Find out what makes these fabulous felines so extraordinary. End the week by presenting the tigers or lions with a toy made in class.

TIME: 9 a.m.-3 p.m.

Ocean Adventure Dive in, make a splash, and learn about the beautiful and mysterious blue world that covers more than half the planet. You won't need scuba gear, but you will take a trip to the National Aquarium in Washington, D.C.

TIME: 9 a.m.-3 p.m.

Grin and Bear It Pandas, sloth bears, and spectacled bears all reside at the National Zoo. Learn how they compare to one another and how the Zoo caters to their bear necessities. Can you bear to miss it?

TIME: 9 a.m.-3 p.m.

» ENTERING GRADES 4-5

Amazon Adventure Spend a week in the rainforest and get face to face with some of the world's most intriguing creatures. Go high in the canopy and then down to the forest floor on a wild adventure that you'll never forget.

TIME: 9 a.m.-3 p.m.

Junior Zoologist Take on the role of a young research scientist and perform some of the same experiments as our Zoo scientists. Meet a few of these animal experts, and discover what it takes to become a great zoologist.

TIME: 9 a.m.-3 p.m.

FONZ

2009 SUMMER CAMP GUIDE

Week 4: July 6-10

» ENTERING GRADES K-1

Extreme Animals Animals are built for survival. They can live deep in the sea, buried in the snow, or in the driest desert. Get answers to your extreme animal questions and make your own illustrated book of the roughest, toughest, fastest, and strongest animals alive.

TIME: 9 a.m.-noon

Rock Around the Zoo Come sing songs and read stories about the animals that live at the Zoo. Each day, you will meet different animals and listen to the sounds they make. In the classroom, you'll recreate these sounds with handmade musical instruments.

TIME: 9 a.m.-noon

» ENTERING GRADES 2-3

Mythical Creatures

Centuars, dragons, and unicorns can all be found at the Zoo. All you need is a little imagination. Take a magical journey with the fabulous creatures from the world's legends and myths and visit the real animals behind the mysteries.

TIME: 9 a.m.-3 p.m.

Leaper Creepers Visit the Zoo's Reptile Discovery Center and meet fascinating creatures lurking behind every corner. From poison dart frogs to the Komodo dragon, slither on over if you dare! Learn about the scary global amphibian crisis and hop into action to save our froggy friends.

TIME: 9 a.m.-3 p.m.

Speak or Squeak Howl like a wolf, trumpet like an elephant, and create an uproar with animal sounds. Learn how creatures everywhere communicate with each other. Clear your throat and get ready to roar!

TIME: 9 a.m.-3 p.m.

» ENTERING GRADES 4-5

Photo Safari Photograph exotic animals big and small. Learn the basics of wildlife photography as you journey through the Zoo. Traditional or digital SLR cameras are encouraged, but point-and-shoot cameras are OK, too. Bring your printed pictures for a photo show at the end of the week. Participants with film cameras will need two rolls of color film per day.

TIME: 9 a.m.-3 p.m.

SUMMER SAFARI DAY CAMP »

continued on following page



Week 2: June 22-26

» ENTERING GRADES K-1

Purr or Growl The Zoo is always purring with excitement. Come and meet our lions, tigers, cheetahs, and other cats. Then learn about your favorite felines through Zoo walks, science projects, and purr-fect crafts.

TIME: 9 a.m.-noon

Great to Be Gross Many people think spiders, snakes, and other creepy crawlers have a serious yuck factor. After learning about their amazing behaviors, you'll see why it's great to be gross.

TIME: 9 a.m.-noon

» ENTERING GRADES 2-3

Project Panda Why do giant pandas eat ten to 16 hours every day? And why are they so endangered? Only about 1,600 giant pandas remain in the wild. Spend a week learning about pandas and what can be done to save this species from extinction.

TIME: 9 a.m.-3 p.m.

What's for Lunch? When you sit down and open your lunch, what sounds better than raw fish? How about crickets or rats? Animals at the Zoo love their specialized meals. Meet the Zoo's nutritionists and take a behind-the-scenes tour to see where animals' meals are prepared.

TIME: 9 a.m.-3 p.m.

Dr. Zoolittle Take on the role of a young scientist and perform some of the same experiments as our Zoo scientists. Discover what it takes to care for endangered animals at the Zoo and to protect them in the wild.

TIME: 9 a.m.-3 p.m.

» ENTERING GRADES 4-5

Animal Behavior 101

Elephants, sea lions, and many other animals receive special instruction from their keepers. Take a seat in the animals' "classroom" and discover the ins and outs of animal training and enrichment.

TIME: 9 a.m.-3 p.m.

Back from the Brink In the race against extinction, "endangered" means there is still time. In this class, be part of the solution as you take part in service projects that will benefit animals, the environment, and the local community. Learn how you can make a difference!

TIME: 9 a.m.-3 p.m.

Week 3: June 29-July 3

» ENTERING GRADES K-1

Down in the Deep Blue

Sea You don't need a swimsuit to learn about the amazing aquatic world. Hold your breath as you meet the Zoo's wettest friends. From playful otters to a curious octopus, learn about many creatures that inhabit the deep blue sea.

TIME: 9 a.m.-noon

Where the Wild Things

Are A wonderful world unfolds in this five-day investigation of the animal kingdom. Each day study a different type of animal, including mammals, birds, and reptiles, as you learn about the wild places they live.

TIME: 9 a.m.-noon

» ENTERING GRADES 2-3

Zoo Dunit

Grab your binoculars and venture through the Zoo to solve clues about the animal kingdom. Test your newly acquired knowledge of Zoo animals and scientific methods and find a treasure chest of zoo-rrific prizes.

TIME: 9 a.m.-3 p.m.

World Safari What kinds of animals live on Africa's plains or in South America's rainforests? Traveling at the speed of one continent per day, you may be surprised at the animals you'll encounter along the way.

TIME: 9 a.m.-3 p.m.

» ENTERING GRADES 4-5

Cats in Crisis

From clouded leopards to cheetahs, many cats are in trouble. The National Zoo and its friends are trying to help these animals. Meet a cat expert and learn about our scientists' efforts to end this crisis.

TIME: 9 a.m.-3 p.m.

Zoo Crew Do you dream about working at the Zoo? Experience what it's like to be a research scientist, animal keeper, and more. Meet National Zoo experts and discover what it takes to run the Zoo.

TIME: 9 a.m.-3 p.m.

Art in the Park

Animals come in all colors, shapes, and sizes. Sculpt a scorpion, paint a panda, doodle a degu, or create a croc. Whether you complete the class a Matisse or Macaque, your creativity is the limit in this class that explores art in the park and in Smithsonian art museums.

TIME: 9 a.m.-3 p.m.

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2009 SUMMER CAMP GUIDE

SUMMER SAFARI DAY CAMP

continued from previous page

Sitting on the Dock of the Bay

The Chesapeake Bay is one of the region's biggest natural resources. Learn about its many residents, from blue crabs to the occasional manatee, and how you can help keep the bay healthy on a field trip to the Smithsonian Environmental Research Center on the Bay.

TIME: 9 a.m.-3 p.m.

Week 5: July 13-17

» ENTERING GRADES K-1

Land of the Lost Gone but not forgotten, learn about how extinct species have left their mark in modern animals. Hear dino-stories and mammoth tales, and saber every minute of it!

TIME: 9 a.m.-noon

Purr or Growl See Week 2 description.

TIME: 9 a.m.-noon

» ENTERING GRADES 2-3

No-Bone Zone More than 90 percent of the Earth's animals do not have bones. Loosen up and discover the incredible diversity of animals that belong in the no-bone zone.

TIME: 9 a.m.-3 p.m.

Drawing Zoo Animals How do you fit a five-ton elephant on a piece of paper? Learn the basics of wildlife art by drawing Zoo animals and animal skeletons, skins, and shells. Finish the week with your own gallery opening!

TIME: 9 a.m.-3 p.m.

Lights, Camera, Animals!

Take center stage and act like a wolf or a python. Help create a set and design your own costume and props. Between rehearsals, you will visit the animals featured in your play. Curtain goes up on Friday!

TIME: 9 a.m.-3 p.m.

» ENTERING GRADES 4-5

Photo Safari

See Week 4 description.

TIME: 9 a.m.-3 p.m.

Animal Behavior 101

See Week 2 description.

TIME: 9 a.m.-3 p.m.

Week 6: July 20-24

» ENTERING GRADES K-1

Panda-mania

See Week 1 description.

TIME: 9 a.m.-noon

Creature Features What if you had ears three feet wide or a full rack of antlers? Observe animals from head to toe. Then create your favorite animal's ears, nose, tail, or toes and try them on for size!

TIME: 9 a.m.-noon

» ENTERING GRADES 2-3

Land of the Giants Join us for a tremendous, colossal, mammoth, humongous, gigantic, enormously fun adventure, as you meet some of the Earth's largest creatures. They're sure to leave a huge smile on your face.

TIME: 9 a.m.-3 p.m.

Rocking Rainforest

Birds chirp, monkeys call, and frogs croak. The rainforest is a noisy place to explore! Investigate the concepts of rhythm and patterns of sound, and create your own rainforest instruments.

TIME: 9 a.m.-3 p.m.

Calling All Cats

See Week 1 description.

TIME: 9 a.m.-3 p.m.

» ENTERING GRADES 4-5

Better Homes and Habitats

What do beavers, bees, birds, and Bob Vila have in common? They are all do-it-yourself, home makeover experts! Dig in to find out how animals construct their masterpieces, then visit the National Building Museum to see how animal building compares to ours.

TIME: 9 a.m.-3 p.m.

Photo Safari

See Week 4 description.

TIME: 9 a.m.-3 p.m.

Week 7: July 27-31

» ENTERING GRADES K-1

Moo at the Zoo Spend the week like Old McDonald and see what life is like on a farm. Meet a keeper and plow headfirst into learning how to care for cows, goats, donkeys, and more.

TIME: 9 a.m.-noon

Lifestyles of the Small and Furry

These animals may be teeny but that doesn't mean they aren't tremendous fun! Meet the Zoo's small mammals and learn why great things come in small packages.

TIME: 9 a.m.-noon

» ENTERING GRADES 2-3

Project Panda

See Week 2 description.

TIME: 9 a.m.-3 p.m.

Great to be a Primate No monkeying around here! Learn all about our primate cousins: monkeys, apes, and prosimians. Meet the Zoo's primates and learn all about what makes them so great.

TIME: 9 a.m.-3 p.m.

Animal Oddities Not all animals appear as cuddly as giant pandas or as regal as lions. Learn about the oddballs of the animal world and find out how their strange but fascinating ways help them survive.

TIME: 9 a.m.-3 p.m.

» ENTERING GRADES 4-5

Junior Marine Biologist

From seals to otters to crabs, marine biologists dive in to investigate. Discover the Zoo's bubbliest animals and meet some of the experts who are keeping them afloat in the Zoo and around the world.

TIME: 9 a.m.-3 p.m.

Photo Safari

See Week 4 description.

TIME: 9 a.m.-3 p.m.

Week 8: August 3-7

» ENTERING GRADES K-1

Animal Families

From a cub in a pack to a great silverback in a troop, animals live in all different kinds of families. Sometimes alone and sometimes in groups, animals care for one another in a variety of ways.

TIME: 9 a.m.-noon

Eat or Be Eaten

Many animals blend into their environments. Come meet a group of Zoo animals that are experts at the game of hide and seek. Learn how they hide from predators and search for prey without being detected.

TIME: 9 a.m.-noon

» ENTERING GRADES 2-3

Take the Plunge!

Splash into the world of aquatic animals. From the streams of North America to the rivers of Southeast Asia, learn about otters, beavers, and other water-loving animals.

TIME: 9 a.m.-3 p.m.

Raining Cats and Dogs

Does a lion have a serious cat-itude? Is a wolf's bark worse than its bite? Find out all about wild cats and dogs here at the Zoo.

TIME: 9 a.m.-3 p.m.

Zoo Dunnit

See Week 3 description.

TIME: 9 a.m.-3 p.m.

» ENTERING GRADES 4-5

Superman-imals

With capes, super strength, disguises, and binocular vision, animals have amazing powers. Learn all about the superheroes (and villains) of the animal world. Make your own comic book about the awesome adventures of Superman-imals!

TIME: 9 a.m.-3 p.m.

Zoo Crew

See Week 3 description.

TIME: 9 a.m.-3 p.m.



Registration begins February 3 at 10 a.m.
Register online at www.fonz.org/camps.htm.

Want to cut the line?
Upgrade your membership to Contributing level or higher and register for camp one week early!

Attention Campers: Explore Nature! CALLING ALL BOYS AND GIRLS ENTERING GRADES 5-10

Join your friends for an overnight nature exploration at the National Zoo's Conservation and Research Center in Virginia's Shenandoah Valley.

The Conservation and Research Center (CRC) in Front Royal, Virginia, spans 3,200 acres and is closed to the public. It is a home for native wildlife, an international conservation training center, and a breeding facility for endangered species. Outfitted with backpacks, journals, and water bottles, FONZ Nature Camp participants delve into CRC's forests, fields, and streams. Dip nets, field guides, compasses, and binoculars are some of the equipment campers use to explore the great outdoors and conduct their own research.

FONZ Nature Camp is accredited by the American Camp Association (ACA) and is the 2007 winner of the ACA Chesapeake Section's Environmental Education Program award.

DURING DAILY HIKES, CAMPERS LEARN A VARIETY OF SKILLS:

Animal tracking: Identify the footprints of deer, raccoons, chipmunks, bears, and more.

Birding/animal identification: Learn to spot feathered friends as well as native insects, amphibians, and mammals.

The scoop on poop: Discover what information you can learn from poop.

Tree identification: Go out on a limb and explore a new branch of nature.

Animal calls: Caw like a crow, gobble like a turkey, and chatter like a squirrel.

WHEN NOT HIKING CRC'S MANY TRAILS, CAMPERS CAN CHOOSE FROM A VARIETY OF ACTIVITIES, MANY OF WHICH ARE TAUGHT BY CRC SCIENTISTS AND KEEPERS. HIGHLIGHTS INCLUDE:

Be a keeper: Find out what it takes to be a keeper at the National Zoo.

Meet an endangered species: Meet some of the endangered species that live at CRC and talk to the scientists who help to conserve these species around the world.

Wildlife art and writing: Discover your inner artist using CRC's picturesque location as your inspiration.

Overnight camping trip: Strap on a backpack and spend a night under the stars.

Swimming: Grab your bathing suit and take a dip in the 4-H Center's swimming pool.

"Wolf, Fox, Rabbit, Grass": Play an exciting predator/prey game at night.

For older campers: A two-week session for 9th and 10th graders provides students with exclusive opportunities to meet world-renowned Smithsonian scientists and learn real-world research techniques. Campers will develop critical thinking skills as they brainstorm solutions for conservation problems facing the Shenandoah Valley and endangered species around the world.

But that's not all—9th and 10th graders will also participate in a variety of fun, interactive field experiences:

Salamander studies
Small mammal monitoring
Insect census taking
Bird identification

Biodiversity monitoring
Monitoring global change
Environmental service projects
And many other exceptional outdoor experiences

Along with the many planned activities, campers of all ages will also have free time for playing games, reading, or just relaxing under a tree. Although athletic equipment is available, the camp has a strict policy of no competition and no score-keeping. In the evenings, campers gather around the fire to hear Native American legends, sing songs, and share stories about the day's adventures.

Please note: Campers will spend much of the day outside participating in physical activities.



JESSIE COHEN/ NZP



JOHN RAPPOLE/ NZP

DATES:

» One-week session for campers entering grades 5 and 6 in the fall: July 5-11.

» One-week sessions for campers entering grades 7 and 8 in the fall: July 12-18 and July 19-25.

» Two-week session for campers entering grades 9 and 10 in the fall: July 26– August 8.

CAPACITY: The maximum is 52 campers per week and a ratio of one staff member to six campers.

STAFF: Staff is certified in Red Cross basic first aid and CPR. At least one staff member is a certified lifeguard. All staff have experience teaching children in an outdoor setting.

LOCATION: The National Zoo's Conservation and Research Center (CRC) in Front Royal, Virginia. CRC is about 70 miles from Washington, D.C.

ACCOMMODATIONS: Campers sleep four per room in air-conditioned dormitories. Boys and girls stay in separate wings, each with its own bathroom. Bathrooms contain individual shower and toilet stalls. Campers may request only one roommate. See your confirmation package for details.

FOOD: Meals are provided by a local caterer. Vegetarian options are available for each meal.

TRANSPORTATION: Parents are responsible for transportation to and from camp.

CONFIRMATION PACKAGE: Upon receipt of registration, we will send you a confirmation email with directions, a packing list, and orientation information. We will also mail medical forms to the registrant's address prior to the camp session.

FEES: To sign up, a current FONZ Household Membership or higher is required. If you are not a member, go to www.fonz.org or call 202.633.4470 to join. Upgrade to Contributing Membership or higher and register for camp one week early, starting January 27. Full payment is required with registration.

One-week session: \$750
Two-week session: \$1,495

CANCELLATION POLICY: For a 75 percent refund, you must notify us of your cancellation in writing via mail or email at least four weeks prior to the start of your camp session. No refunds or changes will be made thereafter.



RICHARD WEIBLINGER / FONZ PHOTO CLUB

Lion in Winter

A swirl of breath surrounds Shera, one of the National Zoo's female lions.

"It was a bitter cold morning," recalls Richard Weiblinger, the FONZ Photo Club member who captured this winter scene. "I was trying to take a photo that showed the lion's steamy breath in the air, but my fingers were almost too cold to depress the shutter of my camera. Shera, on the other hand, seemed unfazed by the cold."

Take Your Best Shot

Consider submitting your photos to **Smithsonian Zoogoer** for a special photo feature that will run in our January/February 2010 issue. Each photo should showcase a particular season of the year at the Zoo. Featuring an animal is preferred, but not required. So come visit the Zoo all through the year, bring your camera, and celebrate the beauty of the seasons. Only FONZ members may participate; limit four photo submissions per individual. Please email your photos to zoogoer@si.edu by November 10, 2009.

Happy snapping!



Sometimes being **green** is as simple as **black and white.**

In an effort to make a real difference in the fight to save endangered species, and appreciating the unique ability of giant pandas to serve as conservation ambassadors to other species, Fujifilm and the Smithsonian's National Zoo formed a partnership in 2000 to help save this rare and photogenic animal.

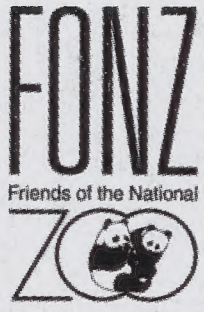
The partnership began with the journey of two giant pandas (Mei Xiang and Tian Tian) from China to Washington, and has since grown to include the science that made the birth of the Zoo's first surviving giant panda cub (Tai Shan) possible. Most recently, Fujifilm and the Zoo renovated and expanded the habitat to include six additional endangered species from Asia.

Fujifilm knows that seeing the big picture is even more important than taking a good one. This collaboration shows everyone can make a tangible and valued difference in the conservation and health of all animals.

Learn more at www.fujifilmfuture.com

FUJIFILM

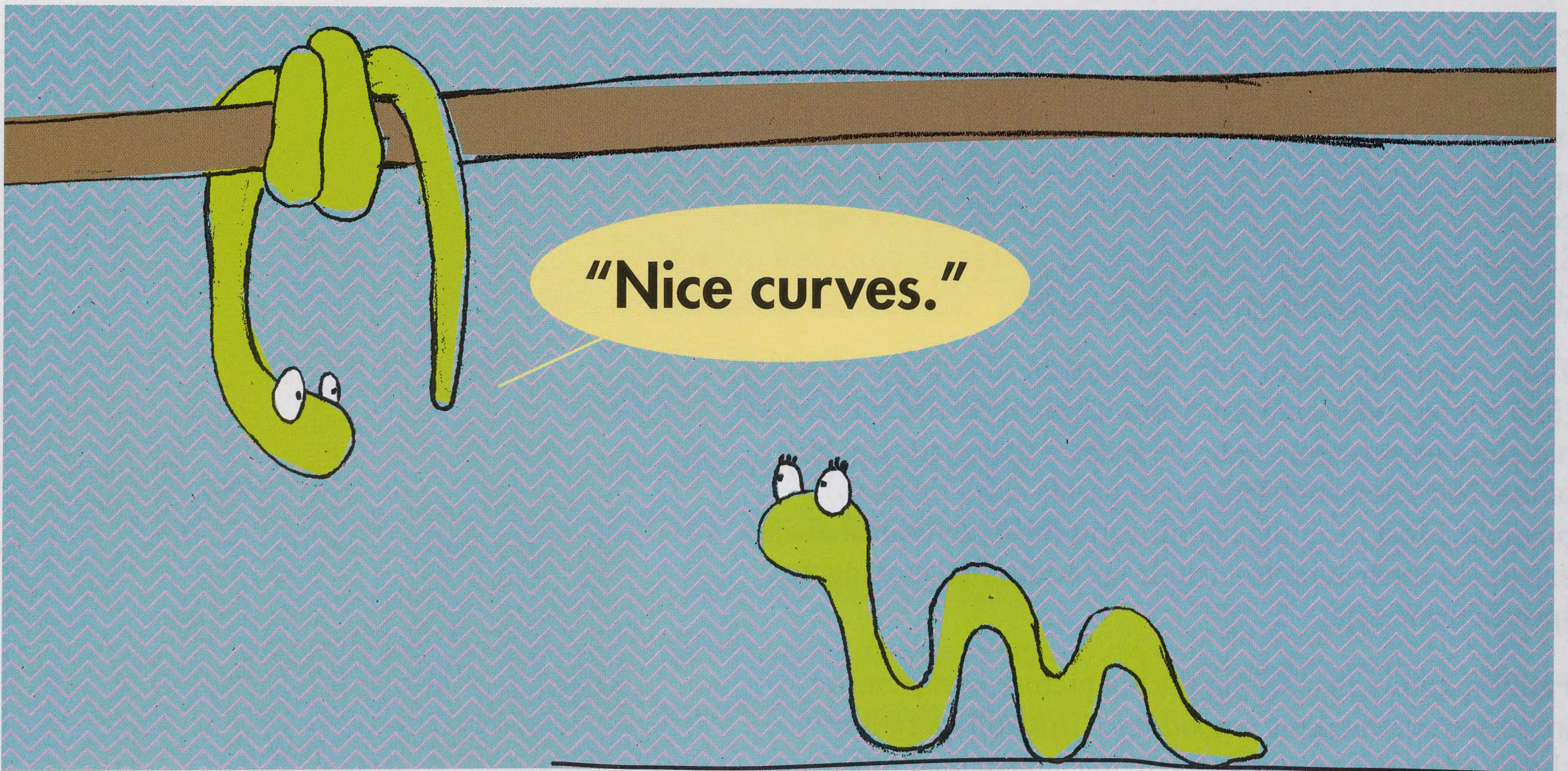




Friends of the National Zoo, PO Box 37012, MRC 5516, NW, Washington, DC 20013-7012, www.fonz.org



Smithsonian
National Zoological Park



Use your smoothest line to find a date for Woo at the Zoo on February 12. Celebrate Valentine's Day by learning about mating habits of your favorite species. Not only will you connect with wildlife, but you'll also connect with each other. Light fare and drinks included. Get tickets at www.fonz.org.woo.htm. Then think romantic thoughts and let nature take its course.